Working with limited resources: Improving storage conditions for archaeological textiles of University of Concepción

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Abstract

This dissertation focuses on the continuation of University of Concepción's project: 'Placing value on the University of Concepción archaeological collection' (in Spanish: *Puesta en valor de la colección arqueológica Universidad de Concepción*), funded by the government in 2010 for the conservation, study and safe storage of archaeological objects under the care of the Anthropology Department. The textile collection was not included at that time.

The University wishes to continue this initiative, and this new project involves the planning of a conservation strategy to improve the textiles' storage conditions and allow future research on their provenance and history within Chilean past, allowing scholars, students and the general public to learn from them and give value to Chilean cultural heritage.

The proposals will be presented to the National Fund for Cultural and Art Development (in Spanish: *Fondo Nacional para el Desarrollo Cultural y las Artes – FONDART*), and hopefully the textiles will begin treatment by winter 2014.

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Introduction to the project

In Chile, Textile Conservation is a small field. There is little information available regarding current measures to improve textiles' condition by means of preventive conservation, and usually no funding comes to this kind of projects because it is not fully understood by the people who review them.

The archaeological textiles collection (a total of 33 textiles including small fragments), currently located at University of Concepción is a rare example of poor documentation and storage conditions. Archaeologists in Chile are most methodical and thorough in their classification and documentation of their finds, but the people involved in this project believe these textiles were not even excavated by archaeologists. There is no information regarding their provenance, and it is most likely they come from various different sites rather than only one, due to the different characteristics of each object.

a. Research questions

- What are these textiles, and where did they come from?
- What is their current condition?
- How can it be improved?
- What resources are available for the conservation of these textiles and how can the author make the best use of them?

b. Aims and objectives

To answer these questions, the following **aims** have been defined:

- To learn more about archaeological textiles and their context in Chile.
- To learn about preventive conservation for archaeological artefacts, particularly textiles.
- As possible, determine causes of damage and deterioration.
- As possible, find out where these textiles came from and which pre-Columbian culture they belong to.
- To devise a conservation strategy to improve the textiles' storage conditions and future interventive conservation measures for their long-term preservation.

In order to achieve these aims, it is necessary to accomplish the **objectives** listed below:

- Research and literature review on the history of archaeological textiles in Chile, as well as preventive conservation associated with archaeological textiles, particularly when stored with other artefacts such as human remains, ceramics and metal, among others.
- Full documentation of the textile collection.
- Analysis, as possible, depending on equipment availability, in order to find out causes of damage and determine which are due to storage conditions and which are evidential of use and provenance (i.e. fibre identification, stereomicroscopy).
- A full survey of the textiles' current location, to understand current conditions (geographical location, relative humidity, light, materials in use for storage, etc.).
- Look into and contact the relevant companies to find appropriate materials for this project and their associated costs, to provide a realistic budget to the University.
- Conversation with the relevant authorities within the University to arrange and devise the conservation strategy for these textiles.

c. Expected outcomes

In combination with the knowledge acquired through research on preventive conservation measures and that of the analysis of the textiles themselves, the author will be able to propose a plan of action to improve the textiles' current situation.

Doing this research and working on these textiles will help the author to learn more about not only archaeological textiles but also the current issues regarding preventive conservation in Chile and how to address them in this particular collection of textiles. These findings will be transferrable to future projects and within the Textile Conservation community, not only in Chile but South America as well, and hopefully will shed a light on the issues at hand and give awareness to the institutions involved in order for them to provide funding for this kind of projects.

It is the author's hope that this project will allow a sense of realisation that textiles are also an important part of our cultural heritage, and can provide historical evidence of earlier trade routes, construction techniques and insight on the pre-Columbian cultures' technology and customs.

Chapter I:

Literature Review

I.I Introduction

The literature reviewed for this project was focused on preventive conservation measures applied to archaeological textiles (often together with other archaeological artefacts), archaeological textiles in Chile (their history and context) and the type of damage often found in archaeological textiles, particularly woollen and hair textiles and how they can deteriorate in inappropriate storage conditions – as is the case with this textile collection in question.

I.II Preventive conservation of archaeological textiles

In general the conditions that need to be met for an environment appropriate for the long-term preservation of archaeological textiles are the same as for other historic textiles. A medium relative humidity (RH), ranging from 45-65% ideally with fluctuations of no more than 10-15% every 24 hours and a relatively low temperature to prevent mould formation (25ºC or less, ideally 18ºC).[1,2] Low light levels are recommended to prevent dyes from fading and yellowing of the fibres through photooxidation: for storage it is best to have no light at all, and although when working on them light levels can be as high as 200-300lux, for display purposes it is best not to go above 50 lux as the textiles will be affected by it for a much longer period of time. Ideally no UV (max 75µM/lumen); and appropriate pest monitoring to prevent infestation and subsequent damage to the objects.[3,4]

For archaeological textiles, however, these measures must be kept and monitored much more strictly. This is because they possess characteristics that other historical textiles are often treated for. Soil, for example, is often kept in archaeological textiles due to its evidential value, and may interact with the storeroom's dust or have detrimental reactions to light (especially considering how it accumulated in an area deprived of light altogether – a burial environment); it may be particularly sensitive to humidity making the textile more

[1] Sarah Staniforth, "Relative humidity as an agent of deterioration," in *The Manual of Housekeeping*, rev.ed. (London: National Trust, 2011), 103-113.
[2] Crispin Paine, ed., *Standards in the Museum Care of Archaeological Collections 1992.* London: Museums & Galleries Commission, 1992.
[3] Linda Bullock, "Light as an agent of deterioration," in *The Manual of Housekeeping*, rev.ed. (London: National Trust, 2011), 93-101.
[4] Crispin Paine, ed., *Standards in the Museum Care of Archaeological Collections 1992.* London: Museums & Galleries Commission, 1992.

susceptible to mould growth or bacterial attack; it may have components attractive to pests that could further damage the fragile fibres and construction of the objects; among other possibilities.

In the case of Chilean archaeological textiles, which are generally found in extremely dry conditions, the passage from burial to the open environment, when excavated, is already quite a shock in terms of oxygen intake, increased RH and temperature, sudden exposure to light, etc. Textiles may be found in surprisingly good conditions, but deteriorate much more rapidly than other textiles after excavation because they have adjusted to the burial environment and cannot acclimatize properly to their new environment – sometimes the deterioration rate is as fast as 30% in less than 50 years, even when in good storage conditions.[5] Preventive conservation measures should be applied from the moment of excavation, and it would be ideal to have a textile conservator in the field in order to ensure the well being of the textile artefacts. Cronyn's *The Elements of Archaeological Conservation* establishes simple guidelines that anybody in the field can become aware of in order to care for the objects as soon as they leave the ground. Excavators, archaeologists, museum curators, field specialists, scientists and conservators alike can and should learn from these guidelines, as they affect not only the objects but also the extent of the work that can be undertaken on them when they reach the laboratory.[6] This book is a compendium of archaeological conservation, written in a concise, practical way, easy to read and covering a wide range – if not all – of materials found in archaeological objects.

There are some useful publications dedicated specifically to pre-Columbian textiles' conservation, such as *Los textiles precolombinos y su conservación*, from a Cultural Heritage Regional UNESCO project in conjunction with the National Museum of Archaeology and Anthropology in Lima, Perú.[7] This type of publications are focused to the general public rather than museum-related professionals, but they are useful in terms of displaying what was and currently is being done in museums for the preservation of archaeological textiles.

[5] Federico Kauffmann Doig, "Los textiles en el Museo Nacional de Antropología y Arqueología," in *Los textiles precolombinos y su conservación*, ed. Juana Truel, 7-8 (Santiago: Proyecto Regional de Patrimonio Cultural UNESCO/PNUD, 1979).
[6] J.M. Cronyn, *The Elements of Archaeological Conservation* (London: Routledge, 1995).
[7] Juana Truel, ed., *Los textiles precolombinos y su conservación* (Santiago: Proyecto Regional de Patrimonio Cultural UNESCO/PNUD, 1979).

They're not very specific in terms of the type of techniques used to clean, fumigate or treat these objects, but rather explain quite generally why treatment should be done and how important it is to keep these valuable objects for future generations to learn from.

I.III Archaeological textiles in Chile

Although there is still a gap in terms of literature devoted to archaeological textiles in Chile, there are still many publications and work done on them by anthropologists that have become interested in textiles. These publications are mostly written from an anthropology point of view, and even if they do go into great technical detail, they don't include much about preventive conservation or environmental measures for this kind of textiles. Most of it is applied from what was mentioned before, the 'general' guidelines applied for any historical textile. They do however provide a great insight into the cultures that created the textiles, and it will most likely make the identification of the collection much easier thanks to their detailed photography records and descriptions. One of these publications is Fuentes' *Tejidos Prehispánicos de Chile*, where a collection of archaeological textiles owned by the National History Museum (in Spanish: *Museo Histórico Nacional*) was analyzed and catalogued by a group of anthropologists (including Fuentes) based on the previous work of Dr. Max Uhle (one of the founders of the archaeology field in Chile) when these textiles were excavated between 1912 and 1913.[8] Although this collection is much larger and representative of five different cultures of the North of Chile, its resemblance to the collection located at University of Concepción is relevant in terms of how that collection was also "neglected" as no specialists were found at the time to study them. They were kept in the Museum for years until in 1965 Fuentes decided to take the challenge to catalogue them and see what could be learned from them. He was lucky in that the Museum took good care of the textiles from the beginning, and they were not mixed or poorly stored like Concepción's collection. Fuentes' technical analysis of the textiles will be useful for the future research of Concepción's textiles, to find their provenance and reveal their history.

Other more specialized books, like Hoces de la Guardia's *Manual de técnicas textiles andinas: terminaciones*, explain in great detail the different type of weave and finishes

[8] Jordi Fuentes, *Tejidos Prehispánicos de Chile* (Santiago: Editorial Andrés Bello, 1965).

found in Andean textiles.[9] This will provide a great aid in describing construction details and techniques found in the textiles at University of Concepción, and will provide insight on which culture(s) they might belong to.

I.IV Types of damage for woollen and hair archaeological textiles

In order to prevent further damage, it is important to understand the damage already present in the collection. The author took great care to find some literature regarding the type of damage that is most often found in archaeological textiles: damage due to the burial environment, and that due to poor storage conditions. Although with the current tools the author is unable to determine exactly these types of damage (mould, insect damage, etc.) some of them can be observed by the naked eye and compared with what is available in the literature.

As it is known that the textiles in the collection are hair (possibly Vicuña, Llama or Alpaca hairs, maybe mix of two or all three together), the review has been focused on proteinaceous fibres alone, more specifically wool and hair fibres. What has been found so far is consistent with the damage observed on the textiles, and will be very useful in future analysis when the proper equipment is available for research. Lewis' "The Biodeterioration of Wool by Microorganisms – Its Causes, Effects and Prevention" is particularly useful as it presents many photographic examples of the damage of wool under mildew and bacterial attack, as well as explaining the causes of its development and how to prevent it.[10] Also, Cooke's "Creasing in Ancient Textiles" will prove useful to try and determine which creases are evidential and which have been caused by the textiles being poorly stored for so long in a confined space.[11]

[9] Soledad Hoces de la Guardia and Paulina Brugnoli, *Manual de técnicas textiles andinas: terminaciones* (Santiago: Museo Chileno de Arte Precolombino, 2006).
[10] J. Lewis, "The Biodeterioration of Wool by Microorganisms – Its Causes, Effects and Prevention," in *Microbial aspects of the deterioration of materials,* ed. R.J. Gilbert and D.W. Lovelock, 153-185 (London: Academic Press, 1975).
[11] William D. Cooke, "Creasing in Ancient Textiles," *Conservation News* 35 (1988): 27-30.

I.V Conclusions

This project presents many challenges and issues regarding the provenance and history of the textile collection. The literature reviewed (and that continues to be reviewed throughout this project) will help the author understand the current state of the collection and why it came to be like it is. What factors affected the textiles and how can they be improved to prevent further damage?

The examples shown in this review will aid in the comparison of known and observed damage in other archaeological textiles (mould, insects, creases, soil, etc.) with the ones observed in the textile collection, to try and find what happened and which damage is or is not evidential of use or of the objects' history and provenance. It will be interesting to reveal this information as the project progresses, and the author hopes to be able to access the appropriate equipment to do the necessary analysis.

Chapter II:

Chile, Archaeology and the University

II.I Textile conservation of archaeological textiles in Chile

Textiles, in the archaeology world, are normally the hardest, most difficult to find among archaeological sites due to their fast deterioration. Organic materials are, generally, the ones that decay most rapidly in burial environments, and towards the Central and Southern regions of Chile they are practically non-existent because of the increased moisture and humidity.

However, the North of Chile possesses an exceptionally dry climate which, combined with appropriate soil composition, allows for the long-term preservation of organic material – including textiles. The Northern region was once filled with lakes – now evaporated – that have left behind a vast reserve of salt deposits, immersing the soil with salts, saltpeter, and sometimes metals' sulfates and oxides, which enable the dehydration of the cadavers before decomposition begins. As a result, textiles in this region are sometimes found intact covering the dry bodies of their owners.

There are large textile collections found in the North of Chile, but other artefacts have been given higher priority in terms of conservation and attention. This is possibly due to the lack of expertise by the professionals working the field, unaccustomed to find any organic material to begin with, and also because textiles are often not as visually attractive or robust as other objects, becoming unlikely to be wanted for exhibition purposes.

Textile conservation as a field, in Chile, is very small, and is even smaller when considering archaeological textiles. The professionals working as textile conservators are often archaeologists, anthropologists, textile designers or conservators of other materials that have become interested in textiles. Most of them have learned all they know from practice, from working in the field, from attending small workshops and courses and working in museums as volunteers, and there are a select few who have trained specifically in textile conservation.

II.II Ethics

The code of ethics followed by the Gremial Association of Conservators/Restorers of Chile (in Spanish: *Asociación Gremial de Conservadores/Restauradores de Chile – AGCR*) is adapted from the European Confederation of Conservator-Restorers' Organizations (ECCO) code of ethics from 2003.[12] Please refer to **Appendix I** for more information.

There is, however, no specific code of ethics for Chilean archaeologists.

II.III Archaeology at University of Concepción

Although the University no longer has a specific Archaeology Department, its Anthropology School holds a very large archaeological collection that has its origins in the old Archaeology Institute that was once part of the University. The collection was donated to the Institute in the 1970's, and before 2011 there were no efforts to study or preserve these objects. A group of anthropologists who graduated from the University decided to do something about this, and they made sure that more than 2,000 pieces were catalogued and properly stored in one of the classrooms that the University appointed as a storeroom: Classroom 7 (in Spanish: *Aula 7*).[13]

The project, named 'Placing value on the University of Concepción archaeological collection' (in Spanish: *Puesta en valor de la colección arqueológica Universidad de Concepción*), was funded by the National Fund for Cultural and Art Development (in Spanish: *Fondo Nacional para el Desarrollo Cultural y las Artes – FONDART*) and focused on the fulfillment of minimal preventive conservation measures for the collection.[14] This included preparation of guidelines for handling the objects appropriately and also creating an access protocol to the storeroom for the benefit of students and researchers. It was divided in two stages:

[12] "AGCR Chile," Asociación Gremial de Conservadores Restauradores de Chile, http://www.agcrchile.cl/ (accessed July 28, 2013).
[13] "Los tesoros arqueológicos que Antropología resguarda en el Aula 7," in *Panorama UdeC*, Universidad de Concepción, http://www2.udec.cl/panorama/p679/p12.htm (accessed July 28, 2013).
[14] "Fondos de Cultura". Consejo Nacional de la Cultura y las Artes - Gobierno de Chile, http://www.fondosdecultura.gob.cl/ (accessed July 28, 2013).

- First, the cataloguing of the objects according to archaeological criteria: defining culture, material, period and use of each artefact. The conservation of some of the pieces was carried out as well, and containers were made to store them safely for their long-term preservation and to be readily available for future research.
- Second, a public broadcast was made to make the collection known to the public, and a temporary exhibition – free of cost – was created where professionals explained the value of the collection and its meaning through talks, graphic material and literature.

However, the textiles found within this archaeological collection were not part of the initiative, and they were not catalogued or conserved in any way. Although their storage conditions improved – considering how they were initially cramped inside a ceramic vase –, there is no information concerning their provenance, materials or techniques of manufacture or use.

The anthropologists involved in the project were not experienced to include the textiles in their initiative, and public funds are often very limited; there was likely not enough money to include a textile conservator for the project. Because of this, these textiles remain in the dark in terms of what we know about them, and although they are generally quite robust and stable, there is still much to be done to improve their storage conditions.

Chapter III:

The Textile Collection at University of Concepción

III.I Context

The textiles at University of Concepción have, sadly, remained in the dark for many years. The University has worked hard to give value and proper care to their broad archaeological collection, but the textiles have been left out of these efforts due to lack of expertise and budget restraints, and priority has been given to other projects.

Now, the University is once more focusing its efforts to the archaeological collection, currently under the care of Mr. Pedro Andrade.[15] Their plan is to include the textiles in their project 'Placing value on the University of Concepción archaeological collection', which begun in 2010, and put the whole collection in a context of planning for their future long-term conservation.[16]

Below, brief descriptions of each object and general characteristics can be found. For full documentation and technical reports please refer to **Appendix II**. The textiles have been organized by the inventory number assigned according to their storage conditions (where more than one textile was stored in the same place, they share the main number and are divided by lowercase letters, alphabetically).

The collection has been divided into **large textiles**, **bands**, **bags** and **fragmentary textiles**, for the purposes of ease of understanding their current condition within this document.

III.I.a Large textiles

There are a total of four large textiles in this collection.

- **UdeC-MA.01** is plain weave, warp-faced, showing a striped design in multiple colours. Possibly a shawl, shroud or perhaps a blanket. One edge is present but no visible selvedges.
- **UdeC-MA.02** is plain weave, warp-faced, showing a striped design in three main colours: brown, red and yellow. Both selvedges are present. As **01**, its purpose is unknown but could be a blanket, shawl or shroud.

[15] Personal communication with Mr. Pedro Andrade, May 2013.
[16] "Los tesoros arqueológicos que Antropología resguarda en el Aula 7," in *Panorama UdeC*, Universidad de Concepción, http://www2.udec.cl/panorama/p679/p12.htm (accessed July 28, 2013).

- **UdeC-MA.03** has been sewn on the sides, perhaps for burial purposes (a shroud maybe?). It is plain weave, warp-faced, showing a striped design in three natural colours. Two selvedges are present, unknown if it's two separately woven fabrics or just one that has been cut (figure 1).
- **UdeC-MA.04** is a small, square shaped tunic, plain weave, warp-faced, showing a striped design in two natural colours. Woven with an opening for the neck (finished with a black, dense blanket stitch) and open on both sides. One edge is present, revealing a decorative finish that also strengthens it.

Figure 1. **UdeC-MA.03**, shown on one of its sides. Photo chosen as a representative example of the 'large textiles' group.

All four textiles present a warp-faced plain weave. **UdeC-MA.01** and **02** present completely different design and colours, while **UdeC-MA.03** and **04** have almost exact same colours and striped design.

III.I.b Bands

Four bands were found within a plastic bag, stored in a plastic tray along two other plastic bags containing fragmentary textiles and a few bags (figure 12). They have all been catalogued under the **UdeC-MA.07** number and listed as **a**, **b**, **c** and so forth. As mentioned earlier, the inventory numbers were assigned according to their storage conditions.

The bands were assigned the following numbers:

- **UdeC-MA.07.a** is small woven band with horizontal stripes in red and natural white colour. A diamond-shape embroidery in bright turquoise colour can be seen on the front side. Plain weave, warp-faced, both selvedges present, although original length of the band is unknown.
- **UdeC-MA.07.b** is a woven band with horizontal stripes in red, tan and natural white colour. Plain weave, warp-faced, both selvedges present, although original length of the band is unknown.
- **UdeC-MA.07.c** is a small woven band, dark brown with metallic beads sewn onto it (possibly silver, see figure 2). The beads are shaped like a dome, they are hollow and very fine. As with the others, the weave is plain and warp-faced. Although the surface looks plain, the warps are a mix of dark brown and dark red colour.
- **UdeC-MA.07.d** is very densely woven, warp-faced (?) plain weave band. Wefts are burgundy and warps are orange (although they have faded to brown) and black, creating fine stripes that curve in equal intervals to shape ovals. Very intricate.

Figure 2. **UdeC-MA.07.c**, showing both sides. Photo chosen as a representative example of the 'bands' group.

They all seem very different from one another in terms of design, particularly **UdeC-MA.07.c** that seems to be Araucanian rather than Northern (which is from where most of this collection is believed to belong to) because of the use of metal and the darker colours.

III.I.c Bags

There are only two textiles in the collection that can be confirmed to be bags, and one other that is incomplete for confirmation but will be included in this list according current available information and observations.

- **UdeC-MA.05** is a small, rectangular bag. Plain weave and warp-faced, shows a striped design in natural colours that vary from red to brown. Design is the same on both sides, as it is folded in the bottom. Has one seam on each side and a finished edge on the opening.
- **UdeC-MA.06** is a small, rectangular bag. Plain weave and warp-faced, shows a striped design in multiple colours and geometrical shapes (figure 3). Design is the same on both sides, as it is folded in the bottom. Has one seam on each side (same type as found in **UdeC-MA.05**), a supplementary seam on the bottom, reinforcing the damaged fold, and a finished edge on the opening.
- **UdeC-MA.07.n** is possibly a bag. It is folded on one side and sewn on another. Also plain weave and weft-faced, has a striped design in blue, red, black and brown. It is thought to have been a bag because it has the same configuration as the other two, with a seam on one side that matched the type of seam found in the others.

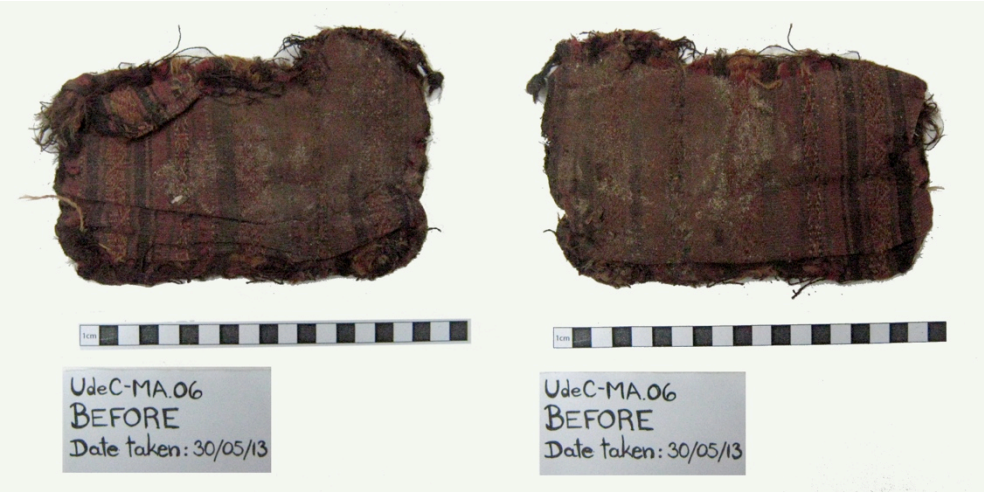

Figure 3. **UdeC-MA.07.c**, showing both sides. Photo chosen as a representative example of the 'bags' group.

Both **UdeC-MA.05** and **06** are stored together in a plastic tray (figure 11), whereas **07.n** is stored along other fragmentary textiles in a plastic bag (figure 12).

III.I.d Fragmentary textiles

What could not be classified into the three groups described earlier falls into the 'fragmentary textiles' category (figure 4). Fragmentary textiles are those that could not be identified as a specific object. Some of them are completely different from all other textiles and some of them seem to have belonged to some of the 'large textiles' at some point.

For the purposes of this dissertation, however, determining the origins of these fragments will not be a priority and will be left for future research work on this collection along with figuring out which culture(s) it belongs to and what its provenance is. It can be said, however, that they are all plain-woven, usually warp-faced or balanced weave in a variety of colours and thicknesses.

The assigned numbers for these fragments include all **UdeC-MA.07** starting from **UdeC-MA.07.e** to **t**, except for **UdeC-MA.07.n** that has been included in the 'bags' category.

Figure 4. **UdeC-MA.07.t**. Photo chosen as a representative example of the 'fragmentary textiles' group.

In order to be able to devise a proper conservation strategy for the textiles – and in conjunction with the efforts to do the same for the rest of the archaeological objects within

the collection – full documentation and research was carried out in order to know the textiles' current condition, the storeroom's characteristics, the available resources and their associated costs, and the time necessary to complete the preventive conservation initiative.

III.II Documentation

III.II.a Introduction

Upon the trainee conservator's arrival at the University, each textile was assigned an inventory number – for the purposes of this project only; they will not necessarily be used by the University for their own inventory –, and photographs were taken showing both sides of each textile and details of damage type and condition characteristics.

The photography process in itself was carried out in the same storeroom, using the space as possible and covering the tables with tissue paper to allow a smooth surface for the textiles to rest on as well as to provide a neutral colour background for the photographs. The labels were hand written, as at the time the exact number of textiles within the collection was unknown and no computer or printer was available. No colour cards were used, as none was available. A small scale (20 centimetres wide) was made and printed to use as reference for the photographs. The camera used was a Canon PowerShot A470, using its automatic white balance setting and configuring the ISO depending on the light available in the storeroom as the day passed – illumination wasn't particularly good and as the sun set the light was even dimmer.

The documentation process included condition reports and technical characteristics of each textile, including thread count, yarn characteristics, overall measures and any construction details (seams, finishes, selvedges and decorations). Each textile will have diagrams associated with it, showing relevant characteristics and damage. They were observed by the naked eye, sometimes using a magnifier and a thread counter. A lantern was also used, as sometimes the light of the storeroom was too dim. Fibre samples were taken from the textiles as possible for future fibre identification under the microscope.

III.II.b General condition details

The archaeological collection arrived in the University in the 1970's, when the Archaeology programme still existed. It remained there for decades before Mr. Pedro Andrade, archaeologist and current manager of the collection, discovered the artefacts hidden in one of the storerooms of the University. There was an effort in 2010 to improve the collection's storage condition and it was transferred to a different storeroom, *Aula 7*. The textiles (33 in total, including small fragments) were originally in a large ceramic vase (figure 5), cramped together. When Mr. Andrade found them, he took great care to remove them and place them in slightly better containers, although the textiles remain in quite precarious storage conditions, they are much improved in comparison to the ceramic vase.

Figure 5. The ceramic vase where all the textiles were once stored.

Because the textiles were kept together in a small confined space for so long, most of the soil and damage found in them is consistent with poor storage and environmental conditions, although the author does not have the necessary tools yet to determine this for certain. If this is the case, it could also mean that most of the soiling and damage is

rendered ‘contaminated’ and no longer evidential for study purposes, although a more thorough analysis using more specialized tools (stereomicroscopy, microscopy, scanning electron microscopy, among others) might reveal otherwise.

This ‘contamination’ theory is based on the observation of several types of damage that are found on almost all the textiles of the collection, described in Table 1 and 2. In addition, Table 3 shows the general condition of the textiles in terms of creases, distortions and structural damage. Refer to **Appendix III** for the Tables and photographic references on each type of soil and damage.

III.III Storeroom survey

A thorough survey was carried out within Classroom 7 of the University of Concepción, which serves as the storeroom for the entire archaeological collection. Strengths, weaknesses, opportunities and threats (S.W.O.T.) were noted and taken into consideration. Please refer to **Appendix IV** for S.W.O.T. analysis.

III.III.a Executive summary

The main points considered in this survey are:

- Geographical location
  - Taking this into account will allow for information on the possible temperature and relative humidity variations, insects native to the area, etc.
- Storage
  - Materials currently being used for storage: are they appropriate?
  - Current facilities: metallic modular shelves.
  - Ease of handling objects safely within the storeroom.
- Preventive conservation
  - Monitoring measures: relative humidity, temperature, pest control, light levels and UV levels.
  - Documentation and assignation of inventory numbers according to the University’s system.

- Access
  - Safety measures currently taken to handle the objects and move them within the storeroom when needed for observation and research.
  - Labelling and photographic reference on the storage boxes – ease of access and prevent excessive movement and handling of the textiles.
- Materials
  - Paper, card, tapes, adhesives, tools – what does the University have for the collection's conservation and storage?

II.III.b The survey

- Geographical location
  - University of Concepción is located in the South of Chile (VIII Region), in the city of Concepción. The city is geographically East of the Coastal Mountains and the Bío Bío river limits its Southwest end (figure 6).

Figure 6. Map of Concepción area, showing the river and ocean in reference to the city of Concepción (marked in red) and the University (marked in blue).[17]

  - Mostly rainy weather, strong winds and high relative humidity.
  - The author was unable to contact the University's entomologist to find out more about the types of insects present in the Concepción area, or if they would present a threat for the collection. Some literature was found indicating types and amount of

[17] Screenshot taken from ©Google Maps Chile, http://maps.google.cl/ (accessed 19 July, 2013).

insects in different areas (i.e.: coastal, riverside, forests): very technical, specialized articles that the author felt unable to understand fully.[18] It is hoped that there will be a future chance to speak with the entomologist to plan the pest monitoring system in the most informed way.

- The University comprises multiple buildings and gardens located in the slope of a hill, with a variety of trees, bushes and flowers right next to were Classroom 7 (the storeroom) is located.
- The storeroom itself is in the ground floor of a large round building that comprises mostly classrooms and conference rooms. Right next to Classroom 7 is the cafeteria, and although the kitchen itself is not very close, the smells still reach the room through the non-hermetic door.
- The University area is prone to flooding when the rain is excessive, and there is a risk of the room being flooded as a consequence. Although the building itself is up on a small hill and has staircases to access it, in an extreme event flooding could be a possibility (so far the flooding has been restricted to the garden areas and the buildings have not been affected).

- Storage
  - Currently materials used for storage of textiles include corrugated cardboard (not acid-free), plastic trays, polyethylene plastic bags and some Tyvek® sheets. See figures 7 – 12 for reference.

[18] Patricio A. Camus and Rodrigo M. Barahona, "Insectos del intermareal de Concepción, Chile: perspectivas para la investigación ecológica," *Revista Chilena de Historia Natural* 75, no. 4(2002): 793-803, http://dx.doi.org/10.4067/S0716-078X2002000400013.

Figure 7. **UdeC-MA.01**, possibly a shawl, in its current storage tray (as placed on the shelf).

Figure 8. **UdeC-MA.02**, possibly a shawl, partially covered in Tyvek® (as placed on the shelf).

Figure 9. **UdeC-MA.03**, partially covered in Tyvek® (as placed on the shelf).

Figure 10. **UdeC-MA.04**, a tunic, partially covered in Tyvek® and a piece of corrugated cardboard (as placed on the shelf).

Figure 11. **UdeC-MA.05** (upper) and **UdeC-MA.06** (lower), two bags, in its current storage tray placed on top of a Tyvek® sheet (as placed on the shelf).

Figure 12. **UdeC-MA.07** (a – t). All smaller textiles (bands and fragmentary), contained within 3 plastic bags on a tray (as placed on the shelf).

- The storage facility consists in metallic modular shelves, installed on a rail system that allows each shelf to slide in order to open (or close) the aisle between two of them to access the objects (figure 13).

Figure 13. *Left:* General view of the shelving system.
Right: Closer view of one of the shelves while open, revealing the rails on the floor.

- The shelves are in good condition although no labels are found on the outside other than the shelf number. The objects that are already stored and labelled can be easily found once the shelf has been slid open, but there is no information on the outside. If unfamiliar, there is a need to open each shelf in order to find what's inside them, provoking excessive movement on the objects.
- Within each shelf there are 5 ledges, all equal in height, labelled from A to E (E being the top). Most textiles are on the top ledges (E) of shelves 2 and 4 except **UdeC-MA.04**, which is on ledge D of shelf 9.
- The system is useful and working properly. However, the aisle that opens when the shelves are slid is not very wide (less than a metre), making it difficult to handle large objects or boxes without help (figure 14).
- Space is limited in the classroom due to multiple other boxes and trays being used for storage outside the shelves, and the presence of tables and chairs for lectures. This classroom is usually not used for lectures, but often students and scholars come in for research purposes.

Figure 14. Mr. Pedro Andrade standing with a wooden object inside the open shelving system, as reference of the space available.[19]

[19] Photography by César Arroyo ©2010.

- Preventive conservation
  - Currently there are no monitoring measures within the classroom. Windows can't be opened and the blinds are usually shut, so there is not really a problem with natural light levels (figure 15).

Figure 15. View from the outside of the storeroom. Round shape, large windows. The blinds that are partially open (left) are far from the shelves and the textiles.

  - The main entrance door is not hermetic and when not locked it is subject to be easily opened by wind or to be left open when people come in or out of the room (figure 16). Air easily flows under it and odors can be perceived from outside.
  - The lamps are tungsten and are believed to not pose a threat to textiles, although currently they are not covered or inside boxes; prolonged exposure will still damage them when the shelves are open.
  - Insects found in the textiles appear dead and inactive, and there was no evidence of current pest problems within the room. Still, it is important to implement a pest control system.

Figure 16. The door of the storeroom is a pull/push type of door, which is easily open when not locked with a key, and is not hermetic.

- Maintenance and cleaning of the room seems to be efficient and carried out on a regular basis following the same criteria as with other classrooms within the University. Objects are not touched; most of them are in boxes so they can be cleaned on the outside to prevent dust deposition.

- Access

  - There is no photographic record of the textile collection other than the trainee conservator has taken for purposes of this project. A full photography record is recommended for inventory and database purposes, as well as being available for publishing (printed or digital).
  - A database was created for the archaeological collection as part of the project carried out in 2010, but the textiles were not included. This database is not available

online and only a few photos of the collection can be found as part of a Facebook album, without much description or information of each object.[20]

- There is no trolley for moving objects around. The room is quite small so there's no real need for a trolley, and the University does have trolleys available in case the objects need to be moved elsewhere.
- Currently the textiles are not labelled in any way, and there is no ease of access without manipulation.
- There is no previous documentation on the textiles and they have yet to be assigned inventory numbers. Numbers assigned for this project are not being used at the University and were devised for this project alone. In the future the textiles will be added to the University's database, as were the rest of the objects in the archaeological collection.

- Materials
  - The storeroom had a couple of sheets of thick Ethafoam®, although partially cut. However, they are not stored and are accumulating dust.
  - Latex gloves and masks could be requested to the University, although difficult to obtain if the person appointed to the laboratories was not available.
  - The author took all other materials and tools for the purposes of documentation and this survey.

[20] César Arroyo, "Museo arqueológico UdeC," https://www.facebook.com/media/set/?set=a.334776019928898.74456.319381108135056&type=1 (accessed July 30, 2013).

III.IV Conclusions and Discussion

In summary,

- Even though they are no longer cramped inside the ceramic vase, the textiles remain poorly stored.
- Materials in use are inadequate and insufficient, leaving the textiles exposed to the storeroom's environment.
- There are no materials available within the University to improve the storage conditions in the short term.
- There are no environmental controls, which is worrisome considering the variety of objects being stored together within the shelves.
- The textiles are stable and do not appear to be actively deteriorating due to pests or mould, but this cannot be confirmed until further analysis is carried out.
- There are no organic materials (except wood) in the store other than the textiles, so there is no threat regarding pests or mould transferring from them to other objects, if they were indeed active.

There is an urgent need to improve storage conditions of these textiles, and sadly the author could not do much during the visit to the University. Materials are scarce and difficult to find in Chile, particularly in Concepción, which will mean perhaps the need to either import them or devise a short-term alternative that will need to be replaced in the future.

Other than the implementation of environmental controls (a hygrometer, thermometer, pest traps, among others) there is no need for improvement of the actual room. An air conditioning system to control temperature and relative humidity would be very beneficial but this won't be proposed, as it would fall outside of the approximate budget limits for this project.

There is sadly no immediate solution for the access issue regarding the space available between shelves when they're open. The room has no extra space to open them any further, so for larger objects it would be best to ask someone for help to take them to the workspace.

Workspace is not an issue, as tables can be put together for larger objects to be placed. Most of the objects are quite small so this is mostly not necessary. There is a wet room adjacent to the classroom, but it doesn't have a practical purpose other than being able to wash your hands without having to go to the toilets, which are also quite near to the classroom.

Overall, the classroom itself does not present a problem for the storage of textiles, but control measures must be implemented. This would allow constant monitoring of the storeroom's conditions and be able to prevent unexpected issues (i.e. if temperature is rising too much during specific times of the year, it could promote the installation of an air conditioning system) and pest infestation.

Chapter IV:

The Project – A Conservation Strategy

IV.I Introduction

This project focuses on the improvement of current storage conditions of the textile collection at University of Concepción, including the implementation of environmental control measures.

The issues that were considered when preparing the proposals and plan of action were:

- Limited budget – possibility to apply for public funding for 2014.
- Limited availability of conservation-grade materials.
- Everything must be done within University grounds; the textiles cannot be moved elsewhere unless absolutely necessary and with the proper authorization by the Council of National Monuments (in Spanish: *Consejo de Monumentos Nacionales*).[21]
- Restrictions of available space and infrastructure of the storeroom.

IV.II Executive summary

Taking into account all the information collected from the visit to the storeroom, the survey and documentation of the textile collection and the literature review prepared for this project, these are the points that will be addressed for the proposed strategy. Refer to **Appendix V** for time and cost estimates.

- Storage
  - Improvement/replacement of materials currently in use.
  - Better storage according to the shelving system and needs of the objects (i.e. lying flat within custom made boxes).
  - Suggestions on maintenance according to current storeroom infrastructure.
- Preventive conservation
  - Monitoring measures: relative humidity, temperature, pest control, light levels and UV levels.
- Access
  - Avoid handling objects directly by use of digital media.

[21] "Consejo de Monumentos Nacionales," Consejo de Monumentos Nacionales, http://www.monumentos.cl/OpenNet/asp/default.asp?boton=Hom (accessed July 28, 2013).

- Safety measures to handle the objects and move them within the storeroom when needed for observation and research.
- Project proposal for a full online database available through the University's website, available for scholars, current and prospect students and the general public.
- Appropriate labelling and photographic reference on storage boxes to allow ease of access and prevent excessive movement and handling of the textiles.
- Documentation and assignation of inventory numbers according to the University's system.

IV.III Plan of action

IV.III.a Storage

All textiles require new storage materials as soon as possible. As the rest of the archaeological collection has been properly packed within standardized size boxes, it is logical to maintain this style of storage for ease of access and coherence with the rest of the collection. Also, the 'box-system' will be a good improvement for the textiles, as they are not too big to need to be rolled, for example. All of them can be easily stored in boxes that fulfill their needs in terms of padding and protection from environmental conditions and dust.

However, in Chile some of the materials needed are difficult or impossible to find. Acid-free corrugated cardboard, for example, doesn't exist and is quite expensive to import for such a small project, so an alternative has been devised by Chilean conservators.

The author found references of paper and photography conservators using papier mâché card (in Spanish: *cartón piedra,* see figure 17) to make the boxes, and line the inside of the box using acid-free paper. The Andrés Bello Central Archive of the University of Chile (in Spanish: *Archivo Central Andrés Bello de la Universidad de Chile*) and many other smaller studios and archives use this technique to compensate the lack of acid-free cardboard found in the market.[22] It is believed that the papier mâché card, although not acid-free, is appropriate for temporary storage, and the acid-free paper lining should work well as a

[22] "Archivo Central Andrés Bello," Universidad de Chile, http://archivobello.uchile.cl/category/productos-a-la-venta/ (accessed July 30, 2013).

barrier between the box and the object(s). The author could not find any bibliographic references regarding the use of papier mâché card in conservation, and it would be interesting to carry out some tests before the manufacture of the boxes.

As temporary storage, however, the author believes it's a good compromise in terms of material and costs, even though further testing is needed to confirm the use of this material for long-term preservation of historical textiles.

Figure 17. Photo of the 'papier mâché card' (*cartón piedra*, also *cartón Europa*). Its natural colour is grey, but it comes in a variety of colours.[23]

a. The boxes

- The four 'large textiles' will be stored in four boxes of 90cm long, 44cm wide and 10cm tall. This is the maximum size for a box, due to the modular shelving system measures. The box will not only be lined in acid-free paper as mentioned, but it will also have a base of tissue paper for the textile to rest on, and another layer on the top in order to completely cover it and conceal it from any dust that might find its way into the box while acting as a second barrier layer against the card.
  - **UdeC-MA.01:** the box will allow for the most damaged areas to lay easily on the box, folding the textile once on the warp direction. Acid-free tissue paper padding will be made for the fold in the shape of 'sausages' as necessary, preventing new creases and friction damage to the textile.
  - **UdeC-MA.02:** will be stored in the same manner as UdeC-MA.01, folding the textile only once in order to fit the box and padding accordingly using tissue paper.

[23] Photography by Papelera Dimar S.A. ©2013, http://dimar.cl/ (accessed July 28, 2013).

- **UdeC-MA.03:** this textile should fit in the box comfortably without the need of any folds. Tissue paper will still be made into padding for the inside of the textile, to act as a barrier between its two layers and prevent further damage by friction between them.
- **UdeC-MA.04:** same as above, this textile should fit in length and need only one fold in the center (or two folds towards the center, depending on the fit within the box). Padding will be added accordingly using tissue paper.

- All 'bags' will be stored together:
  - **UdeC-MA.05**, **UdeC-MA.06** and **UdeC-MA.07.n:** it is believed to be best to keep all objects of similar characteristics stored together for future reference. A box will be made to fit all three bags inside, with appropriate divisions made in the same paper-lined card and padding using tissue paper.
- As above, all 'bands' will also be stored together in a box of equal measures to those used for the 'large textiles'. Although the longest band (**UdeC-MA.07.d**) is longer than 90cm, one of its edges can be folded carefully and rested onto tissue paper padding to prevent further damage.
  - **UdeC-MA.07.a**, **UdeC-MA.07.b**, **UdeC-MA.07.c** and **UdeC-MA.07.d:** three of the bands will lay comfortably with no need for folding. Divisions and padding will be made accordingly.
- For the 'fragmentary textiles', a special box with two sections – one on top of the other – will be made to allow them all to be stored together for future reference.
  - **UdeC-MA.07.e – m** and **UdeC-MA.07.o – t:** using the same dimensions as the ones used for the 'large textiles' but taller (20cm instead of 10cm), the box will allow a 'second floor', using the card for divisions that will act as support for the second layer. Everything will be lined in acid-free paper, with appropriate divisions – one for each fragment – and padding as needed.

b. Maintenance and cleaning suggestions

- Current housekeeping of the storeroom is adequate and does not need any improvements. It is important to remember, however, the importance of the objects in store, and if any manipulation of the boxes is absolutely necessary, the following recommendations should be followed:

- Large boxes such as the ones proposed for the textile collection should be handled by two people due to the narrow aisles of the shelving system.
- All boxes should always be kept in the same horizontal position as are found in the shelves.
- All boxes should be moved carefully trying to avoid vibrations and placing them softly on the tables while cleaning the shelves.
- The person in charge should always check that the boxes have been put back in their original location with labels facing outwards in the right position.

IV.III.b Preventive conservation

There are currently no environmental control or monitoring in the storeroom or its surroundings. It is important to keep this in check as it could prove necessary to move the textiles elsewhere or implement additional measures to protect them (from pest infestation, for example). Although in general the humidity shouldn't be too high because of the old building's concrete construction, it is important to monitor it in order to prevent future problems with mould or insects. Temperature is usually very low (again, due to the building's construction and also geographical location), and no heaters are installed in the room. It is possible that a small heating source will be added when Mr. Pedro Andrade's desk is installed, as this room is planned to become his office in the near future. This shouldn't present a problem for the textiles, however, as it wouldn't be central heating and the temperature would not even rise that much to affect the textiles in any way.

Light levels are quite low as well, which makes it hard to examine the textiles without additional lighting. It would be good to install a couple of lux meters in the storeroom, particularly where the textiles are to be kept, to see if there is any cause for concern. Considering they will be kept within their boxes most of the time and the light in the room itself is not too bright (nor hot), the author believes the current lighting system should not be a problem. Regarding UV levels, the blinds are shut at all times and the sunlight never hits the room directly, due to its location and the building's architecture.

The monitoring system should include:

a. Environmental control and monitoring

- Hygrometers should be installed:
  - One in the wall near where the textiles will be kept.
  - One closer to the door.
  - One in the wet room, as it is quite small and currently cramped with many different materials that could absorb and/or release humidity over time.
- Thermometers should be installed next to each hygrometer, to keep in check the correlation between temperature and relative humidity within the storeroom's different locations.
- Lux meters, if possible:
  - One facing the lighting source on one of the top ledges of the shelf where the textiles will be kept.
  - One facing the windows, near the area where the textiles will be kept.
- If implemented, the environmental monitoring system should also be constantly checked and controlled by the person in charge of the storeroom (possibly Mr. Pedro Andrade, currently in charge of the whole archaeological collection).
  - It is recommended to check the hygrometer and thermometer at least once a week (same day, around the same time of the day) and write down the results to keep any fluctuations in check.
  - It would be good to check constantly (twice a day, every working day) for the first month of implementation to have an idea of the fluctuations occurring in a short timespan.
  - This equipment does not need any special maintenance in itself other than making sure it's operational, clean and free of any obstructions and changing the batteries if needed.
  - According to the analysis of the results obtained after a few months of monitoring the equipment, solutions can be devised in case problems are found. If, for example, RH is found too high during certain months, an appropriate regulation system such as dehumidifiers can be implemented, and the

documentation necessary to reveal the need for this investment can be shown to the relevant authorities.

b. Pest control

- Although there is no evidence of pest infestation within the storeroom, and the maintenance and cleaning procedures are appropriate, it is still important to keep insects in check. Insect traps should be placed:
  - One near the windows, in the back of the room.
  - One near the door.
  - One in the wet room, next to the door.
- It would be good to start with basic traps, as the insects that frequent the area are unknown. If one of them begins to appear frequently in the traps it would be interesting to try some specialized traps with the lure for that particular insect, see if they indeed propose a threat for any of the objects within the storeroom.
- Traps should be monitored regularly to prevent pest infestation and allow the implementation of appropriate solutions before any of the objects are attacked. The following is proposed as a 'monitoring schedule' for the traps:
  - Each trap (in this case, three) should be labelled with a number or letter to remember which one is located where.
  - An Excel® sheet will be prepared and printed out with each trap's number (or letter) and location, indicating which insects are found in them, how many of each species and if they are alive or dead by the time and date of inspection.
  - Inspections should be carried out every two weeks (same day, about the same hour), writing down the information in the Excel® sheet.
  - As more insects might appear within each inspection, the sheet is very important to not re-count already counted insects.
  - Traps should be replaced according to the instructions on the package or if they are thought to be full and no longer useable.
  - This type of monitoring will allow the observation of types of insects and if they present a threat or not to any of the objects within the storeroom, as well as giving valuable information on the amount of insects appearing depending on the time of the year.

- This information can be related to the RH and temperature monitoring information, and conclusions can be made if there is a relation between the insects and the environmental characteristics of the storeroom. In this way, solutions can be devised to prevent pest infestation and consequent damage to the textiles or other objects.

c. Documentation

- A vital part of this project is the thorough documentation and inventory assignation of each and every textile within the collection. This will include:
  - An object record, describing all technical aspects of each textile including construction details, evidence of wear, colour characteristics, types of weave and fibres used, etc.
  - A condition report including all types of damage found in the textile: structural damage, insect damage, types of soiling, discolouration, creases and distortions, re-woven areas, etc.
  - Full photographic record of all objects individually, using a proper photography setting with professional lighting, use of colour cards and scales and appropriate cameras to document every detail.
  - Inventory numbers will be assigned to each textile, according to the University's database system that was created in 2010 for the rest of the archaeological collection.
  - Diagrams will be used to aid the documentation process when needed, and will be used in conjunction to the photographs to allow minimal manipulation of the textiles themselves, while still providing accurate information on them.
  - Recommendations for handling and safekeeping will be added at the end of all documentation, with the necessary suggestions for the appropriate care of the collection.
  - All documentation will be kept up to date, with allowance for future observations to be added, as these textiles will be subject to research.
- This process has already begun as part of the preparation of this dissertation, but there are still observations to confirm and discuss with professionals in the field of pre-Hispanic textiles. The final inventory system to be applied to the collection

within the University requirements also needs to be discussed. No scientific analyses have been carried out yet due to lack of equipment.

- It is very important to consider that this type of documents are always subject to change and updating: all information in the first stages of this project will most likely be either confirmed or rectified after further research and analysis has been carried out.

IV.III.c Access

a. Safe access measures

- As mentioned earlier, it is important to keep in mind that the aisle created when opening the shelving system is quite narrow, making handling large objects and boxes quite difficult.
  - Before even opening the shelf, is it important to be mindful of the storeroom's available space. Prepare the space in advance, gather tables together if necessary, create a free path for moving the boxes from the shelf towards the working station and make sure there are no obstacles in the floor that could provoke tripping, slipping or unbalancing while the object is being moved.
  - After preparing the route and the workstation, the shelf should be opened to its maximum extent, to allow the largest space possible for manipulating the boxes. If the box is large (like those proposed for the 'large textiles', see page 45), a second person is recommended for handling and preventing both uncomfortable positioning and the fall of the object itself. For smaller boxes, they can be easily transported by one person alone, and most objects in the archaeological collection are quite light.
  - Place the box carefully on the workstation, leaving a space to place the lid of the box and any tissue paper that might become an obstacle.
  - If it is absolutely necessary to remove the textile from its box, a space should be prepared in advance for it to lay flat on the table. To lift the textile from the box, pick up the excess of tissue paper on each side and gently lift it, followed by sliding the hands under the textile itself. If the textile is too large, a second person might be needed for ease of handling.

- Avoid any unnecessary handling of the objects, and retain any soil or fibres that might come off during the process. They can be placed on sample bags, labelled accordingly and stored with the object in the same box. Make note of this on the documentation papers as well.
- Always make sure you have all your equipment, tools, lighting, sample bags, etc. before taking the objects from the shelf.
- When not working on the objects, keep them covered with tissue paper and make sure to leave a sign to prevent anyone else coming into the storeroom from touching or manipulating them.

b. Labelling

- Appropriate labelling is very important when trying to find an object within a storeroom. Considering some of the boxes proposed in this plan of action will contain more than one textile, labelling must be carefully planned and implemented on each box to allow ease of access and prevent opening boxes just to see what's inside them.
  - The boxes have a height of at least 10cm, which gives enough space for inventory number(s) and a small photographic reference of the object(s) within the box. These can be placed on transparent plastic 'pockets' that can be easily replaced if the box is used for something else in the future.
  - This information will be placed on both the lid's side (for ease of access while they're still in the shelf), the top of the box, and the exterior wall of the box, to prevent any misplacing of lids onto other boxes when working on multiple objects at the same time.
  - When the boxes are opened, the objects will still be covered and protected by tissue paper. A small acid-free card sheet can be placed on an appropriate area inside the box, with a 'map' showing the location, photograph and inventory number of each object (when there's more than one). The card should be light enough not to provoke any pressure on the objects, and should be updated when necessary. The 'map' will be concealed within a transparent plastic (or Melinex®) envelope, to prevent any ink from transferring onto the textiles.

- Each textile will have a small acid-free card label associated with it, showing its inventory number. In robust enough textiles, this label can be attached directly using a fine, undyed cotton thread. When this is not possible, the label will be sewn to the padded board associated with that object (refer to **Chapter V**).

c. Online database

- After consulting with Mr. Pedro Andrade, it was thought to be appropriate to create an online database for the archaeological collection (not only the textiles, but the entire collection). This, however, will be done separately from the work on the textiles itself, and will greatly aid in the cultural diffusion of the collection (raising awareness and enhancing their value) as well as allowing researchers, students and prospect students to have access to these objects without the need of direct manipulation.
- The University would like to follow the model used at the website of the Chilean Pre-Columbian Art Museum (in Spanish: *Museo Chileno de Arte Precolombino*), but nothing has been specified yet in terms of the database system or the style/layout that will be used for the University's website.[24] This will be discussed with both Mr. Pedro Andrade and a graphic designer, to devise the best strategy for the construction of an efficient, easily accessible and attractive database.

[24] "Museo Chileno de Arte Precolombino," Museo Chileno de Arte Precolombino, http://www.precolombino.cl/ (accessed July 30, 2013).

Chapter V:

The Future – Interventive Conservation

V.I Current situation

There is no information on the textiles' provenance or culture of origin. Through research, observation and comparison with other Chilean textiles in which that information is available, the author can interpret and elucidate the collection's origins. So far, some literature has been found from which the author may draw a few conclusions regarding the provenance of these textiles, but it will be necessary to contact other professionals and discuss these textiles in depth before any assumptions can be confirmed.[25,26]

There are also a variety of tests and analysis that can be carried out in order to shed a light on this type of information, but expensive equipment or external testing facilities are needed, such as Scanning Electron Microscopy (SEM) or Fourier Transform InfraRed Spectroscopy (FTIR), among others. Perhaps it would be possible to apply for external funding, but at this point the University wishes to focus only in the improvement of storage conditions.

After reviewing literature regarding types of damage found in archaeological textiles and how to spot them, the author found that the basic tests that could be performed within the University will not aid in their determination and/or when they might have occurred (i.e.: while in use, during burial or after excavation). Cooke's article on fibre damage is particularly useful as it provides detailed descriptions on the different types of damage textiles might present, from the very growth and preparation of the fibres to their manufacture, use, burial and finally excavation and post-excavation.[27] It also has photographs from the tests he carried out showing good references on how to identify them under very high magnification using SEM. These will be extremely useful if this kind of analysis can be undertaken as part of this project.

It would be good, perhaps, to propose this as a separate project and apply for future funding, as this kind of information would be priceless regarding obtaining data on these textiles: their manufacture, provenance, use and history.

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[25] Jordi Fuentes, *Tejidos Prehispánicos de Chile* (Santiago: Editorial Andrés Bello, 1965).
[26] Anne. P. Rowe, "Warp-Patterned Weaves of the Andes," *African Arts* 10, no. 4 (1977): 72-74.
[27] Bill Cooke, "Fibre damage in archaeological textiles," in *UKIC Occasional Papers*, 5-14 (London: United Kingdom Institute for Conservation, 1990).

The role of these textiles affects and will determine the conservation strategy devised for them. For now, their future remains uncertain, and the University wishes to take this process step by step and start with the basics: improving their current condition and allow easy access for study. It is possible, however, that at some point this collection will be part of an exhibition in the Archaeology Museum within the University, but this will not be planned until more has been learned about these textiles.

Considering this, the author is focusing on a minimally interventive conservation approach for the textiles.

V.I.a The University's available resources for conservation

At this time, the University has little resources for the conservation of the textile collection, and relies almost entirely on public funding options available at the Cultural Funds (in Spanish: *Fondos Cultura*) of the National Council of Arts and Culture (in Spanish: *Consejo Nacional de la Cultura y las Artes*).[28]

Current infrastructure is also insufficient for the analysis and testing needed to be carried out on these textiles. However, it could be possible for the Anthropology Department to borrow equipment or infrastructure from the Chemical Sciences Faculty, depending on their availability. This would allow the author to carry out fibre ID and possibly observe the objects under magnification (stereomicroscope), but no specialized tests can be carried out there (i.e. SEM).

The current workspace is large enough for the author to work in, but equipment and materials are needed for some of the minimally interventive conservation proposals described in **V.II**. It would be possible to either rent or purchase this equipment (such as vacuums or humidifiers), but the author believes it would be much better to move the textiles to a studio where they can be properly treated. This could possibly reduce costs as well, considering the studio's rental would include the equipment within it and the University doesn't need these machines for other purposes so the investment would not be justified. This is yet to be discussed further with Mr. Pedro Andrade and with textile

[28] "Fondos Cultura," Consejo Nacional de la Cultura y las Artes – Gobierno de Chile, http://www.fondosdecultura.gob.cl/ (accessed July 30, 2013).

conservator Ms. Alejandra Pérez, whose studio would likely be used for this project, if possible.[29]

V.I.b Is it possible to move the collection elsewhere? How?

The idea of moving the objects elsewhere was raised when faced to the problem of lack of equipment and infrastructure in the storeroom. Although there is space available to work on the objects (i.e. tables and chairs), lighting is not adequate and there are no conservation tools whatsoever (i.e. humidifier, low-power vacuum, paper supplies, etc.). Everything would have to be taken there and installed, which would reduce the space available for students and lecturers that use that room normally.

The collection would benefit from moving onto a more appropriate, private workroom, as it would be easier for the conservators to work on them and perhaps it would be cheaper for the University, as there is virtually no need for them to possess the kind of equipment mentioned, making the investment less likely to be considered viable.

The collection can be moved as long as the proper documentation and bureaucracies are completed appropriately and in order through the Council of National Monuments (in Spanish: *Consejo de Monumentos Nacionales*). There is no cost for these bureaucracies, but there would be a cost associated to appropriate packing and transport of the textiles and an insurance policy might apply in this case as well.

Transportation would most likely be at the expenses of the author and people involved in the project. Considering the textiles are quite small, and will be stored in boxes with appropriate padding by the time the collection needs to be moved, they can easily fit in a private car or van, both available.[30] This will reduce costs for the project itself, and allow ease of transportation as the conservators will be directly involved in the process, making sure everything is secure.

The project that will apply for 2014 funding is, for now, only for improvement of storage of the textiles – as described in **Chapter IV** of this document – and any other conservation measures will be further discussed and planned for next year's funding. In this chapter, the

[29] Personal communication with Ms. Alejandra Pérez, June 2013.
[30] Personal communication with Mr. Pedro Andrade and Ms. Alejandra Pérez, June 2013.

author will focus on the specific costs and time estimates for the conservation itself and will not go further into calculating transportation or rental of a studio.

V.II Treatment Proposals

Following the aim of a minimally interventive conservation treatment for the improvement of these textiles condition and allow future study and research on their provenance and historical relevance, the following is proposed for all textiles alike, with some specific commentary on certain objects. Refer to **Appendix V** for time and cost estimates.

V.II.a Cleaning

For each individual textile, an evaluation will be made to determine the potential benefits of selected surface cleaning techniques (i.e. brushing, vacuuming, the use of chemical sponges or erasers, among other options).

Choice of soil removal will be based on visual observation. Cleaning will be carried out according to the following criteria:

- If it is justifiable to do so and the soiling is not considered significant.
- If it will facilitate the understanding and study of the textile.
- If it is possible not do damage the textile in the process.

As explained in **Chapter III**, some of the soil is believed to have occurred after excavation (i.e. white soil, dust, cobwebs, etc. Refer to **Appendix III** for details), and this is the soil that can be removed without jeopardizing the future research and analysis of soil that might be evidential of wear or burial traditions (i.e. dark brown and light brown soil, 'muddy' soil, corrosion products, etc.).

In the case of some objects, particularly the group of fragmentary textiles found in **UdeC-MA.07.t**, it is unlikely that cleaning will be a viable option as they are extremely friable. Any manipulation releases massive amounts of soil and fibres, and so cleaning them will probably provoke further damage and loss of material.

All soiling that has been removed, along with loose threads, lumps or particulates lying on the surface after cleaning must be recorded, removed and repacked safely inside a labelled sample bag or box for storage with the associated textile.

Thorough documentation will be done for each textile's cleaning process, with details on the materials and tools used to clean and why it was decided to remove what type of soil.

V.II.b Humidification

The aim is to open out those textiles that need it, in order to prevent further fibre deformation while in storage and to facilitate study, as hidden areas may be revealed in the process. Many creases are a result of poor storage, but some of them are possibly evidence of wear and use. Because we can't confirm which creases are due to which reasons, the aim of humidifying the textiles is not to remove them entirely and flatten the object, but rather open up creases and crumpled areas to allow ease of observation.

Each textile will be evaluated for the possible benefits of humidification, and some might not undergo this treatment. The textiles have adapted to the storeroom's relative humidity and temperature, and they seem stable. Still, the humidification process will be slow and controlled, by the use of a chamber, hygrometer and if available, a humidifier (if not, humidity (RH) can be raised within the tent using damp blotter). It's important to control a slow RH increase, as some of these textiles remain very dry and stiff and a rapid increase would result in the fibres not having enough time to absorb water, generating droplets and 'wetting' the textile rather than allowing it to recover moisture. Humidification will be carried out when:

- It is justifiable and would benefit the textile in terms of easing creases and facilitate study.
- It won't cause further damage to the textile by interacting with soil in detrimental ways.

Creases and folds will be recorded before humidification, determining whether they are likely to be the result of wear, burial or storage conditions. In cases where they are stuck together with soiling or sewn together – for example –, creases should not be eased out and no attempt should be made to neither separate them nor remove any seams.

For each textile, the humidification treatment will be planned in advance, considering how long they must remain in the chamber and considering manipulating them within it to prevent excessive handling and movement.

V.II.c Support

If possible, padded boards will be made for some fragmentary textiles that would benefit from the additional support while in storage and to provide safe handling for study. This is the case of: **UdeC-MA.03**, **UdeC-MA.04**, **UdeC-MA.05**, **UdeC-MA.06**, **UdeC-MA.07.a**, **UdeC-MA.07.n** and **UdeC-MA.07.t**.

It is believed that these objects are particularly in need of additional support in comparison to the rest of the collection. In the case of **UdeC-MA.03**, **04**, **05**, **06** and **07.n**, due to their three-dimensional nature, it would be good to manufacture a sort of 'cushion' to prevent the friction between the two layers and prevent further creasing after humidification. This 'cushion' would be made according to the measures of each object, without causing any tensions to them but rather providing support and protection.

UdeC-MA.07.a is a band in which one of the edges is almost detached, and it would be good to prepare a padded board to prevent further damage from handling, allowing the object to lay flat on the board while examined or moved from its box to the workroom.

UdeC-MA.07.t is a group of extremely degraded and soiled objects, and as such it is unlikely they will undergo either cleaning or humidification due to their friable nature. These objects would benefit from a padded board with bespoke cutouts to facilitate handling while preventing any further loss of soil and fibres, allowing observation without direct manipulation of the objects.

Materials will be chosen on the basis of:

- Long-term duration.
- Smooth surface that will allow the textile to remain in place without sliding but without provoking damage by friction.
- Undyed, pre-shrunk fabrics to prevent any detrimental reactions to changes in RH.
- Soft padding such as polyester, that won't be in direct contact with the object but is soft and malleable to prevent tension on the objects.

- Cotton or polyester undyed sewing threads.
- Acid free card or equivalent for the boards, possibly Ethafoam® for the bespoke cutouts needed for **UdeC-MA.07.t**.

V.II.d Research

At the time little is known about the provenance of these textiles. What is known is based on assumptions and comparisons with other similar textiles, but nothing is conclusive as of yet.

Research is a vital part of this project, and it is hoped that analytical testing can be carried out on the collection in order to find out more about how these textiles were manufactured, used, possibly re-used and recycled and then buried. The value of this collection is beyond what can be imagined at this point, and the author is confident that raising awareness on this subject is vital to obtain the necessary funding (and interest) for research and analysis.

Equipment like SEM is hard to come by and expensive to use, but will most likely reveal causes of damage and deterioration much more conclusively than that can be revealed by the naked eye. Even a simple stereomicroscope can show us a variety of details and characteristics that cannot be observed otherwise.

These analysis will be decided after the initial stages of the project have been completed (as described in **Chapter IV**), and will be planned carefully with the University staff in order to decide which tests will have priority over others, and which, perhaps, will not be considered. The University's efforts to make this collection known to students, scholars and general public alike, will surely awaken the interest of other professionals in the field – not only anthropologists and archaeologists but conservators and art historians, perhaps –, enabling the author to converse about the issues related to this collection and address them in a more informed, objective way.

This final part of the proposal will most likely be the longest and will be constantly improved over time as more tests can be carried out, but it will surely be worth the wait to have an exhibition of these textiles once we have a better idea of where they come from, what they mean and what they can teach us about our own heritage.

Conclusions and discussion

From its creation, the textile has accompanied man in life and death. It shows how the individual conceives the body, protects it, embellishes it and shows power or status. Textiles' daily use in our lives often makes us undervalue them, and in the process we are missing valuable information of social and cultural aspects of the human being than once made, wore and reused those textiles. Ideas, feelings, rituals, beliefs, status, technological development, economic and social activities. All these and more we can learn from textiles alone, and they are precious to find in archaeological contexts since, as any other organic material, they are prone to fast deterioration.

A simple identification of deterioration causes is insufficient to approach the conservation of archaeological artefacts, and intervention techniques cannot only be intended for the adequate conservation of the materiality of textile objects.[31] We must also consider its quality as a cultural product. Textiles are not closed; they are open to change, to innovation, to adaptation and improvisation. Particularly archaeological textiles are often recycled, reused, transformed into new objects, to ensure the maximum exploitation of the limited materials available.

This adds a new dimension to approaching archaeological textiles; a usually minimal approach, since every part of the object's history is equally important in terms of cultural characteristics and the evolution of that culture itself.

This project proved to be much larger and complex than initially expected. It was difficult to maintain focus and not enlarge the project into a thorough investigation of the textiles' origins, and concentrate on improving their storage conditions alone. Although this will be the future of this textile collection, the aim for this project was never to reveal the secrets of these textiles because the tools are very limited and cannot be obtained in the short term. With each observation, the textiles turned into riddles, waiting to be solved and understood.

[31] Lemp Urzúa and Cecilia Mariana, "Propuesta metodológica para estudio y diagnóstico de textiles arqueológicos," in *Actas del XVI Congreso Nacional de Arqueología Argentina*. *San Salvador de Jujuy, del 8 al 12 de Octubre* (Jujuy: Universidad Nacional de Jujuy, 2007).

Reviewing the literature was helpful in terms of trying to place these textiles into a specific culture and time period, although nothing can be certain until analytical tests can be carried out. A realization of this lack of information is also due to the author's lack of experience in the subject of pre-Hispanic textiles, and it will be necessary to show these textiles to other professionals (art historians, anthropologists, designers and conservators that are known to the author through their publications in the subject of pre-Hispanic textiles) to discuss these issues and try and determine what period they belong to. Sadly, this was not achieved during the course of this dissertation, due to time constraints and the fact that the textiles are in Concepción, away from the capital, making it hard to organize a meeting that would involve travelling and accommodation expenses.

However, the people involved are very keen in continuing with this project, and it is hoped the University will obtain the funding to start working on the textile collection by 2014. There is much to be learned from them, and the preventive conservation measures proposed in this document are vital for their future research.

Another challenge was the materials. Conservation grade materials are hard to find in Chile, perhaps because it is a small field and there is not enough market. However, there is an initiative by the Spanish company *Productos de Conservación* (in English: *Conservation Products*), in which a Chilean branch might open soon enough to offer all sorts of materials and tools for the conservation of all kinds of objects.[32] For now and for the immediate need to improve the textile collection's condition, it was necessary to compromise certain materials – like the corrugated card – in order to stay within budget; although others – like tissue paper – will be imported from abroad as there are no alternatives at the time. It is possible, however, to find readily available materials that could be perfectly safe for use in textile conservation, but research and analysis must be carried out before determining which materials these might be and what use could be given to them in terms of storage, preventive or interventive conservation treatments. It seems to be a general problem in South America – the lack of conservation-grade materials –, possibly due to the small market that these products have. Others have already spotted this issue and started testing

[32] "Productos de Conservación," Productos de Conservación, http://productosdeconservacion.com/, accessed August 2, 2013.

alternative materials already: such is the case of Catalina Hernández Gómez.[33] It is important to encourage this kind of research, as it might take some time before South America's 'conservation market' is big enough for European or North American companies to come and offer their products. *Productos de Conservación* is truly making an effort, but there is still a long way to go.

The author believes the aims of protecting and improving the textile collection's condition in terms of storage and environmental controls have been considered and dealt with as was expected of this project, and it is only a matter of time before they become a reality. The trainee conservator will also make sure that the conditions are kept and monitored within the University, in order to replace any equipment or materials if needed.

Everything was planned accordingly and it is hoped to receive funding by winter 2014.

[33] Catalina Hernández Gómez, "The use of nonwoven surgical fabrics in textile conservation" (MA dissertation, Textile Conservation Centre, University of Southampton, 2006).

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Appendix I:

AGCR Code of Ethics

Código de Ética

AGCR
CHILE

Asociación Gremial de
Conservadores-Restauradores
de Chile

Santiago de Chile 2008

Desde hace muchos años la comunidad de conservadores - restauradores de Chile venía anhelando la formulación de un código deontológico que estableciera pautas mínimas que guiaran nuestra conducta y práctica profesional y a su vez que entregaran a quienes solicitan nuestro trabajo referencias de las exigencias actuales de la disciplina. Sin ir más lejos, este fue uno de los temas abordados en el 1er Congreso Chileno de Conservación y Restauración realizado el año 2001.

Es por esta razón que al asumir el primer Directorio de la AGCR en mayo del 2006 se impuso como tarea fundamental la elaboración de nuestro Código de Ética. Esta labor fue encomendada a una comisión que debía entregar un borrador para ser aprobado en la siguiente asamblea general de socios a realizar el año 2007. La comisión estuvo integrada por quienes forman el Tribunal de Ética de la AGCR y sus suplentes:

Lilia Maturana M. - Presidenta
Bernardita Ladrón de Guevara G. - Miembro titular
Paloma Mujica G. - Miembro titular
Sandra Gutiérrez A. - Miembro suplente
Alejandro Rogazy P. - Miembro suplente
M. Eugenia Van de Maele S. - Miembro suplente

Los textos de referencia utilizados fueron:

1. Código de Ética de la Sociedad Colombiana de Restauradores de Bienes Muebles (SCRBM), 1999

2. Pautas profesionales de The European Confederation of Conservator - Restorers' Organizations (E.C.C.O), Bruselas 2003

3. Código de Ética de la Associação Brasileira de Conservadores - Restauradores de Bens Culturais, ABRACOR, 1988

El texto aquí presentado fue aprobado mediante votación en la Asamblea General de Socios de la AGCR Chile realizada en Santiago de Chile el día 27 de junio de 2007.

Agradecemos la encomiable y fructífera labor realizada por dicha comisión, la que nos ha entregado un código exigente, pero a la vez acorde al desarrollo de esta disciplina en nuestro país y que esperamos guíe nuestro quehacer profesional y resguarde el patrimonio por el cual trabajamos.

Directorio 2006-2009
AGCR Chile

I

PRINCIPIOS GENERALES

1. El código de ética agrupa los principios fundamentales y criterios orientadores del comportamiento que cada conservador-restaurador (CR) perteneciente a la AGCR debe seguir y respetar para la práctica de su profesión.

2. La profesión del CR constituye una actividad de interés público y debe ser practicada de acuerdo a las leyes y acuerdos nacionales e internacionales.

3. El CR trabaja directa e indirectamente sobre la materialidad de los bienes del patrimonio cultural, por lo tanto, debe asumir la responsabilidad de desarrollar intervenciones que incrementen los valores que le son inherentes y preserven y/o reafirmen los vínculos con la comunidad.

4. El CR tiene el derecho de ejercer su profesión con total libertad e independencia, siguiendo los dictados de su profesionalismo, la ética y el sentido común. Por lo tanto, está en condiciones de rechazar cualquier solicitud de trabajo sobre los bienes patrimoniales que esté reñido con estos principios generales y con este código en particular.

5. La falta de observancia de los principios expresados en este código pondrá en peligro la integridad y significado de los bienes patrimoniales, dañará la relación con los colegas y con la profesión, o bien significará el

desprestigio de la disciplina. Por esta razón la AGCR tiene el deber de hacer cumplir el espíritu y la letra de este código y tomar las medidas que correspondan en el caso de incumplimiento probado.

II

OBLIGACIONES - COMPROMISOS CON EL PATRIMONIO CULTURAL

VALOR Y USO DE LOS BIENES PATRIMONIALES

6. El CR debe preocuparse por comprender el significado de los bienes patrimoniales que interviene.

7. Toda intervención del CR debe estar orientada por el absoluto respeto a la materialidad y al valor y significado estético, histórico y social del bien patrimonial.

8. En el caso de bienes patrimoniales que integran, de manera indisoluble o significativa, una colección o un patrimonio inmueble, el CR debe trabajar en función de mantener esa condición.

9. El CR debe preocuparse por considerar, respetar y cautelar los valores inmateriales que puedan sustentar los objetos patrimoniales, durante todo el proceso de diagnóstico, intervención y, posteriormente, a través de las recomendaciones que señale en los informes respectivos.

10. La intervención de un bien patrimonial que realice el CR debe basarse y ser coherente con el uso y funcionamiento posterior a ésta. Esto implica que los procedimientos aplicados sobre los objetos deben considerar la opinión y el actuar de propietarios y encargados, y las condiciones posteriores de permanencia.

11. El CR debe tomar en cuenta el "uso social" del bien patrimonial a intervenir y debe hacer partícipes de los

criterios y decisiones técnicas a los otros especialistas que tengan conocimiento e injerencia en la materia o del bien en particular.

12. El CR debe limitar los tratamientos a los que sean exclusivamente necesarios para controlar los problemas de deterioro y para mantener o recuperar el valor material, histórico, estético y/o sociocultural.

ESTÁNDARES DE CALIDAD DEL TRABAJO

13. El CR debe realizar sólo aquello que se encuentra dentro de los límites de sus conocimientos y de los recursos técnicos de que dispone.

14. Ante situaciones técnicas o de criterios que despierten dudas al CR, debe buscar el intercambio de información con especialistas de los ámbitos en cuestión, a fin de reorientar o fundamentar sus intervenciones sobre el bien patrimonial.

15. EL CR debe esforzarse por usar sólo productos que estén avalados por un nivel de conocimiento actualizado en el área o por estudios con base científica, y que, además, sean compatibles con la naturaleza de los materiales que forman parte de los bienes patrimoniales intervenidos.

16. El CR debe asegurar las condiciones ambientales de conservación y seguridad para los objetos mientras estén bajo su responsabilidad.

SEGURIDAD DE LAS PERSONAS

17. El CR debe trabajar en condiciones de seguridad tales a fin de no causar daño al medio ambiente, a las personas, ni a sí mismos.

INFORMES DEL TRABAJO

18. Todos los resultados del análisis, diagnóstico, análisis histórico-estético y de las intervenciones realizadas deben ser documentados en forma escrita y visual, mediante un informe que debe, además, incluir el nombre de las personas que intervinieron en las etapas de diagnóstico e intervención. El CR debe entregar una copia de este documento al propietario o responsable legal, y debe tener la disposición de compartirlo con quienes lo requieran. Las partes originales del informe son propiedad intelectual del CR, a excepción de citas bibliográficas, diagramas, tablas e imágenes de otros autores, cuyas fuentes deberán ser citadas en dichos informes.

PROCEDIMIENTOS TÉCNICOS

19. El CR debe basar su intervención sobre los principios generales de la conservación preventiva.

20. A menos que no exista solución técnica alternativa, es necesario evitar que los tratamientos realizados (materiales y procedimientos) inhabiliten futuros análisis y tratamientos posteriores. Deberá quedar constancia de la argumentación de tales intervenciones de forma escrita en los informes de tratamiento correspondientes.

21. El CR no debe retirar ningún material agregado a los bienes patrimoniales a menos que esto sea indispensable para la salvaguarda del bien o porque dicho material interfiera de manera sustancial con sus valores. Cuando ello suceda, documentar completa y minuciosamente todo el proceso, conservar, en la medida de lo posible, los materiales retirados y anexarlos a la documentación.

ACTITUD PERSONAL FRENTE A LOS BIENES PATRIMONIALES

22. El CR debe promover y participar activamente del intercambio de información con los otros profesionales vinculados con los bienes patrimoniales intervenidos.

23. El CR debe esforzarse por enriquecer su conocimiento y habilidades con el constante fin de mejorar la calidad de su trabajo.

24. De manera permanente, el CR debe colaborar en la prevención de deterioros que afecten a los bienes patrimoniales. Más aún, en cualquier situación de emergencia donde los bienes patrimoniales estén en peligro inminente, el CR debe dar toda la asistencia posible, independientemente de su área de especialización, siempre y cuando no esté en juego su propia seguridad personal ni la de eventuales colaboradores o subalternos.

25. El CR debe trabajar con los más altos estándares de calidad de los que disponga, independientemente del valor que el bien patrimonial tenga en el mercado.

MENOSCABO/DAÑOS A LOS BIENES CULTURALES

26. Es obligación de cada asociado advertir a aquel colega que esté realizando intervenciones que pongan en peligro la integridad de algún bien patrimonial. Si éste continúa sin detener los procedimientos que estén resultando perjudiciales, deberá hacer las denuncias correspondientes ante el Tribunal de Ética, en caso de ser un asociado, o ante otras instancias que corresponda, en caso de que no lo sea.

27. Ningún CR asociado podrá estar involucrado en actos ilícitos que atenten contra el patrimonio cultural.

III

OBLIGACIONES - COMPROMISOS CON PROPIETARIOS Y CUSTODIOS DEL PATRIMONIO

INFORMES Y DOCUMENTACIÓN

28. El CR debe documentar la recepción y entrega de los bienes patrimoniales a intervenir, a través de actas firmadas por el propietario o custodio legal y por él mismo, a objeto de delimitar responsabilidades.

29. Es obligación que el presupuesto solicitado por el propietario o custodio sea entregado por escrito y que contenga el diagnóstico del estado de conservación y la propuesta de intervención, de manera comprensible por éste.

30. El CR debe entregarle al propietario o custodio legal un informe de intervención en el cual se deberán incluir recomendaciones acerca de las condiciones ambientales y medidas específicas que garantizan el resultado de la intervención y prolongarán la conservación del objeto. En los casos que lo amerite y sea positivo estimarlo, deberá señalarse el tiempo máximo de duración de la intervención.

RELACIONES CONTRACTUALES Y SERVICIOS

31. El CR tiene la libertad de ofrecer sus servicios a particulares, personas jurídicas, entidades gubernamentales, etc., con un contrato legal o acuerdo que no se contraponga a los principios del código de ética y teniendo

la libertad de escoger el criterio técnico y filosófico de restauración más adecuado para la obra. Las condiciones contractuales con la contraparte deben ser cumplidas conforme lo establecido por la legislación vigente aplicable al contrato en particular, sea éste regido por el Código del Trabajo, el estatuto administrativo o por el Código Civil que rige los contratos privados.

32. Cuando el trabajo en su totalidad o parte de éste, es subcontratado a otro CR, por cualquiera sea la razón, el propietario o custodio legal debe ser informado. El CR original será el profesional responsable de este trabajo.

CONFIDENCIALIDAD

33. El CR está sujeto a la confidencialidad profesional, en materia de identificación de propietario, valor de obra, seguros comprometidos, ubicación de las obras privadas, u otros aspectos señalados de manera expresa por el propietario o custodio legal que no se contravenga con los principios señalados en este código.

PROPIEDAD INTELECTUAL

34. El CR debe tener claro que si bien la propiedad intelectual sobre la documentación del objeto intervenido le pertenece a quien ha realizado la intervención, la divulgación de ésta se halla sometida a las condiciones contractuales pactadas con el propietario o custodio legal.

IV

OBLIGACIONES - COMPROMISOS CON LOS COLEGAS Y CON LA PROFESIÓN

NORMATIVAS LEGALES

35. El CR debe respetar y hacer respetar todas las disposiciones legales y reglamentarias que incidan en las actividades propias de la profesión y denunciar todas las transgresiones a éstas.

MEJORAMIENTO DEL QUEHACER PROFESIONAL

36. El CR debe cooperar en la consolidación y avance de la profesión intercambiando informaciones sobre sus conocimientos y contribuyendo con su trabajo a favor de la asociación.

37. En la medida en que sus conocimientos, competencias, tiempo y medios técnicos lo permitan, el CR tratará de participar en el entrenamiento de los CR.

PROPIEDAD INTELECTUAL

38. El CR debe dar los créditos correspondientes y/o solicitar autorización de sus autores, cuando se utilicen publicaciones, estudios preliminares, diagnósticos, análisis y demás documentación perteneciente a otros colegas u otros profesionales.

RELACIÓN ENTRE PROFESIONALES

39. En todo momento de la práctica profesional, se deben tener en consideración las diferencias existentes entre las distintas especialidades dentro de la disciplina.

40. El CR debe mantener un espíritu de respeto con sus colegas y la profesión.

41. Todos los juicios que se realicen acerca del trabajo de un tercero deben ser fruto de un examen directo y cuidadoso del caso en cuestión y, en la medida que se justifique, mediante un documento escrito.

42. Mientras un CR no se haya desligado expresamente de una intervención que se esté llevando a cabo, terceros deberán abstenerse de reemplazarlo.

V

OBLIGACIONES - COMPROMISOS CON LA COMUNIDAD

43. El CR se esforzará en promover una comprensión más profunda del significado e importancia de los bienes patrimoniales.

44. En caso de objetos de valor en uso activo y/o que están fuertemente vinculados a otros valores, el CR debe hacer partícipe, de manera clara, de las decisiones que tienen consecuencias sobre los resultados de las intervenciones, a los miembros o segmentos involucrados de las comunidades (locales y disciplinarios).

45. El CR se esforzará en promover una comprensión más profunda de la profesión y un mayor conocimiento de la conservación-restauración entre otras profesiones, el público y la comunidad en general.

46. El CR debe proteger la vida y la salud de los miembros de la comunidad, evitando riesgos innecesarios en la ejecución de los trabajos.

ANDROS IMPRESORES
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Appendix II:

Technical Data Sheets

List of Contents and Illustrations

UdeC-MA.01

Inventory number: UdeC-MA.01	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 500x1750mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 1. General photo of UdeC-MA.01, showing what it's believed to be its front side.

Brief description: large textile, plain weave, warp-faced, showing a striped design in multiple colours. Possibly a shawl, shroud or perhaps used for decorative purposes. One edge is present (top of figure 1). No visible selvedges.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 4, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are dark brown in colour, 2-ply ('s'-spun, 'z'-plied) and 1.2mm thick. Thread count is 8 in 10mm.
- Warps are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 34 in 10mm.
- Main blocks of colour are red-brown, with colourful horizontal stripes in blue, dark and light green, yellow, dark and light red and orange. It presents two seams, indicating the use of three separately woven pieces to create this textile.

- The seams consist of multiple-coloured threads interacting between both edges of the textile in an 8-shape, making it look like two blanket stitches one next to the other (figure 2).
- The edges' finish consists of five wefts (these are not twisted with each other) tightly woven as one.
- No other construction characteristics are visible to determine any specific function for this object.

Figure 2. Detail of UdeC-MA.01, showing the seam.

Condition report:

Soiling, discolouration and staining	- Overall discolouration: colours vary throughout the textile, due to different types and amount of soiling. The central area is particularly soiled, showing a very dark brown colour obscuring the colours of the textile itself. It is possible a human body lay on top of this section, causing extensive damage to the fibres due to the weight and decomposition fluids. - Insects' cocoons (moths) and cobwebs are found throughout the surface. These are thought to have occurred after excavation due to poor storage conditions. - Deposited soil, dirt and dust. Mostly dark brown in colour. - Some areas are quite stiff, presenting a white coloured soil, ingrained in the fibres, particularly towards the central area. - Some 'mud-like' soil on the selvedge. Unable to determine if it is indeed mud or perhaps human remains.
Creasing and distortions	- Object is very creased. Although some of these folds and creases are possibly from the burial environment, most of it is believed to have occurred after excavation, when the textile was cramped with the others inside a ceramic vase.
Structural damage	- Multiple tears were found, some right from the edge, other within the fabric, possibly due to insect damage. - Warps seem to have been affected by insects more than the wefts. - The other edge is not present; possibly more than half of the textile is missing. Unknown how large it was originally. - The central area is particularly fragile and stiff. The soil seems to have weakened the fibres in that section to the point of disintegration.

UdeC-MA.02

Inventory number: UdeC-MA.02	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 1135x670mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 3. General photo of UdeC-MA.02, showing what it's believed to be its front side.

Brief description: large textile, plain weave, warp-faced, showing a striped design in three main colours: brown, red and yellow. Possibly a shroud or perhaps used for decorative purposes. Both selvedges are present (top and bottom of figure 3). Overall width was measured from selvedge to selvedge.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 4, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are dark brown in colour, 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 6.5 in 10mm. Some of them consist in one ply dark brown and one ply light brown.
- Warps are 2-ply ('s'-spun, 'z'-plied) and thickness varies depending on the colour. Red and yellow wefts are 1mm thick, while the brown is slightly finer: 0.7mm. Thread count is 38 in 10mm.
- Main blocks of colour are dark brown and red, with one main stripe in yellow and some finer stripes in blue.
- The textile presents several re-woven areas, particularly in the red coloured area, near the edges and around the central section. These are evident because of the different thickness and colour of the yarns used. Most of the reweaving includes both new warps and new wefts. They are also woven much tighter than the rest of the textile, provoking creases and distortions in the weave.
- Evidence of a seam is found on the 'top' edge (see figure 3): a yellow, 1.2mm thick thread ('s'-spun, 'z'-plied). The seam is undone, almost seems to have been cut: possibly the fabric attached to it was removed on purpose.
- The edges consist of three 2-ply threads, each comprising two of the wefts 'z'-twisted together. These are woven in a tight plain weave, adding strength.
- No other construction characteristics are visible to determine any specific function for this object.

Condition report:

Soiling, discolouration and staining	- Overall discolouration: colours vary throughout the textile, due to different types and amount of soiling. The central area is particularly soiled, showing a light-brown/yellow colour thick soil (seems like sandy deposits, often forming clumps), sometimes obscuring the weave and the dark-brown colour of the fabric. - Insects' cocoons (moths) and cobwebs are found throughout the surface. These are thought to have occurred after excavation due to poor storage conditions. - Deposited soil, dirt and dust. Mostly light-brown in colour, but also some red coloured soiling that covers some of the insects' cocoons. This is possibly clay, naturally red in colour and present

	in deserted areas. This could help determining the site of excavation of this textile. - Some areas are quite stiff, presenting a white coloured soil, ingrained in the fibres, particularly towards the central area. This type of soiling seems almost 'printed' on the surface, revealing clean areas where the textile was creased. This allows for the thought that it probably occurred after excavation, as many of these creases are storage-related and are present in the entire collection. - The red section presents a thick layer of dust on the edges, possibly accumulated over time due to inadequate storage conditions – after excavation. - 'Reverse' side seems more soiled, perhaps it was in direct contact with the body, although the type of soil is the same as on the 'front' side.
Creasing and distortions	- Object is very creased. Some of these folds and creases are possibly from the burial environment, most of it is believed to have occurred after excavation, when the textile was cramped with the others inside a ceramic vase. - The red section looks distended and stretched out, revealing the wefts. This probably occurred when the textile was being used, before burial, as is consistent with the re-woven areas. - Some distorted areas provoked by insect damage and subsequent tearing of the weakened fibres.
Structural damage	- Multiple tears were found within the object, possibly due to insect damage. - Both selvedges (see figure 3) show extensive damage due to wear and insects, with loss of both warps and wefts. - Re-woven areas are all located on the red section. It is likely that the red dye used at the time provoked the accelerated deterioration of the fibres in comparison with the brown.

UdeC-MA.03

Inventory number: UdeC-MA.03	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 420x950mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 4. General photo of UdeC-MA.03.

Brief description: large textile, plain weave, warp-faced, showing a striped design in three natural colours. Possibly a shroud, sewn for the purpose of burial. Two selvedges are present (top of figure 4).

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 4, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are brown in colour, 2-ply ('s'-spun, 'z'-plied) and 0.8mm thick. Thread count is 7 in 10mm. A section of the wefts are lighter in colour; the weavers possibly ran out of the brown yarns and continued with a different yarn, as it doesn't affect the warp-faced design of the fabric.

- Warps are 2-ply (‘s’-spun, ‘z’-plied). Tan colour is 0.8mm, brown colour is 0.6mm and the medium brown colour is 1mm thick. Thread count varies from 22 to 12 in 10mm. Where it is less dense, the wefts become visible and the weave seems almost balanced.
- The striped design seems to be evenly distributed in narrow 7mm stripes, but they actually don’t follow a specific pattern and the width varies constantly.
- Presents one continuous seam (see top of figure 4) in dark brown thick thread, comprised of two 2-ply (‘s’-spun, ‘z’-plied) threads ‘z’-twisted together. The same changes onto a yellow coloured thread of the same configuration – apparently the colour of the seam was not relevant for the practical purpose of this object.
- On the opposite side (see bottom of figure 4), there is another seam (undone) in a much thicker thread comprising six threads in itself, each 2-ply (‘s’-spun, ‘z’-plied), ‘z’-twisted together and passed through the damaged edge. Tan in colour, seems to be the same threads used as wefts. One area (towards the right side of figure 4) is particularly tight, finished with a knot, provoking creases and distortions in the weave.
- The visible edge consists of two 5-ply warps (‘z’-spun, ‘s’-ply), woven in plain weave.
- Some areas seem intentionally cut, possibly to allow the shape needed for the object – a tube-like shape.
- No other construction characteristics are visible to determine any specific function for this object.

Condition report:

Soiling, discolouration and staining	- Overall discolouration: colours vary throughout the textile, due to different types and amount of soiling. Some areas also seem faded due to light or other chemical reactions. - Some insects' cocoons (moths) and cobwebs are found (especially on the inside). These are thought to have occurred after excavation due to poor storage conditions. - Deposited soil, dirt and dust. - Some areas are quite stiff, presenting a white coloured soil, ingrained in the fibres, same as present on UdeC-MA.01 and 02. - The colours on the inside of this object look much stronger. - Some orange coloured soiling found on the inside, ingrained. - 'Reverse' side looks more soiled, but colours are stronger than in the 'front'. Possibly this side was not exposed to light but rather in direct contact with the surface where it lay.
Creasing and distortions	- Object is very creased. Although some of these folds and creases are possibly from the burial environment, most of it is believed to have occurred after excavation, when the textile was cramped with the others inside a ceramic vase. - Distortions found where the thick sewing threads are found.
Structural damage	- Overall damaged by insects, some tears occurred provoked by the weakened fibres. Areas of loss involve both warp and weft. - The other edge is not present. Towards the opposite side (see right side of figure 4), the textile presents extensive insect damage and looks more fragmentary.

UdeC-MA.04

Inventory number: UdeC-MA.04	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 720x770mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 5. General photo of UdeC-MA.04, showing what it's believed to be its front side due to the length of the neck opening.

Brief description: small, square shaped tunic, plain weave, warp-faced, showing a striped design in two natural colours. Woven with an opening for the neck (finished with a black, dense blanket stitch) and open on both sides. One edge is present, revealing a decorative finish that also strengthens it (left side of figure 5).

Current location:

Shelf 9, Ledge D inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 9, Repisa D, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are a mix of tan and brown threads, 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 4 in 10mm
- Warps are 2-ply ('s'-spun, 'z'-plied), 1mm thick, distributed in tan and brown colour evenly spaced stripes (usually 7mm each, but it varies slightly). Thread count is 15 in 10mm.
- Object has cords (in yellow and tan colours, 2-ply 'z'-spun 's'-plied) in seemingly random areas near the shoulders especially. They have no apparent function; maybe they were used to hang this garment somewhere or attach it to something else.
- There are some previous repairs/reweaving on one of the selvedges and shoulders.
- The 'proper left' (bottom of figure 5) presents a coarse seam in a dark brown thread comprised of three fine 2-ply ('s'-spun, 'z'-plied) 's' twisted. The edge was reinforced with a med-brown colour thread comprised of two 2-ply ('s'-twist, 'z'-plied) 's'-twisted threads.
- The 'back' bottom edge is lost, damaged by insects. The 'front' edge is partially visible, consisting of two 5-ply warps ('z'-spun, 's'-plied), woven in plain weave and finished with a dense blanket stitch in tan coloured thread.
- Undone seams can be found on both selvedges, in yellow and medium-brown coloured threads. Unknown if these were made while the garment was in use or for burial purposes.

Condition report:

Soiling, discolouration and staining	- Overall discolouration: colours vary throughout the textile, due to different types and amount of soiling. Colours seem darker on the 'front' side. - Some insects' cocoons (moths) and cobwebs are found. These are thought to have occurred after excavation due to poor storage conditions. - A section of what seems like mould was found in the bottom edge of the 'front': white, fluffy texture, attached to the surface. Unknown if still active. - Deposited soil, dirt and dust. - Some areas are quite stiff, presenting a white coloured soil, ingrained in the fibres. Most visible on the inside, on the 'proper left' shoulder section. - Also stiffening the fibres is a dark-brown coloured soil, particularly on the 'back' and the 'proper left' shoulder on the 'front' side. This also seems to be ingrained, and often obscures the colours and striped design. - There is also a light-brown coloured soil in the 'back', ingrained, seems almost muddy creating a layer on top of the fabric. Could this be human remains? - All soiling is present on both the inside and outside of the garment, revealing how ingrained it is and how it has transferred through the weave. - Black particulate soiling falls when object is handled. Seems to be frass.
Creasing and distortions	- Object is quite creased. Although some of these folds and creases are possibly from the burial environment, most of it is believed to have occurred after excavation, when the textile was cramped with the others inside a ceramic vase.
Structural damage	- Overall damaged by insects, the 'back' more than the 'front'. The 'back' bottom edge and shoulders area are the most affected. Areas of loss involve both warp and weft. - Holes and cracks in the fibres due to the stiff light-brown soiling.

UdeC-MA.05

Inventory number: UdeC-MA.05	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 320x210mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 6. General photo of UdeC-MA.05, showing both sides.

Brief description: small, rectangular bag, plain weave, warp-faced, showing a striped design in natural colours that vary from red to brown. Design is the same on both sides, as it is folded in the bottom. Has one seam on each side and a finished edge on the opening.

Current location:

Shelf 2, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*). Stored together with UdeC-MA.06.

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are a dark-brown, although there is an area of tan coloured wefts as well (re-woven maybe [?]), both 2-ply ('s'-spun, 'z'-plied) and 1.2mm thick. Thread count is 5.5 in 10mm.

- Warps are 2-ply ('s'-spun, 'z'-plied), 1mm thick. Thread count is 22 in 10mm.
- There is evidence of small re-woven areas, very finely made, without provoking any evident tension or distorting the weave.
- The edge on the opening consists of five wefts (these are not twisted with each other) tightly woven as one.

Condition report:

Soiling, discolouration and staining	- Overall discolouration: colours vary throughout the textile, due to different types and amount of soiling. Same as found in the other textiles. - Deposited soil, dirt and dust. - Central area is quite stiff, presenting a white coloured soil, ingrained in the fibres. - Also stiffening the fibres is a dark-brown coloured soil, found throughout the object and obscuring the original colours. - Black particulate soil falls when object is handled. Seems to be frass, same as UdeC-MA.04.
Creasing and distortions	- Object is not too creased but it's so stiff that the fold and seams are hard to open out to examine the inside of the bag.
Structural damage	- Insect damage is found in some areas, mostly affecting the warps.

UdeC-MA.06

Inventory number: UdeC-MA.06	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 130x180mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 7. General photo of UdeC-MA.06, showing both sides.

Brief description: small, rectangular bag, plain weave, warp-faced, showing a striped design in multiple colours and geometrical shapes. Design is the same on both sides, as it is folded in the bottom. Has one seam on each side (same type as found in UdeC-MA.05), a supplementary seam on the bottom – reinforcing the damaged fold –, and a finished edge on the opening.

Current location:

Shelf 2, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*). Stored together with UdeC-MA.05.

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are a dark-brown 2-ply ('s'-spun, 'z'-plied) and 1.2mm thick. Thread count is 13 in 10mm.

- Warps are very fine 2-ply (‘s’-spun, ‘z’-plied), 1mm thick. Thread count is 52 in 10mm and 36 in 10mm in the geometrical shape bands, where there are supplementary – not continuous – warps.
- The edge on the opening is almost completely degraded; difficult to say how it is made due to soil and damage.

Condition report:

Soiling, discolouration and staining	- Overall discolouration: colours are almost completely obscured in some areas, the soil is very thick; most of it is the white coloured soil found in other textiles, making the fibres very stiff and brittle. - A very defined line near the damaged edge reveals the end of the soil and the colourful yarns underneath it. - Colours on the inside are much cleaner and brighter, revealing the geometrical design much clearer than on the outside.
Creasing and distortions	- Object is heavily creased. - Weave is distorted where insects have damaged the fibres and opened the weave due to the creases. - Distortions also appear on the folded – and later sewn – bottom of the bag.
Structural damage	- Insect damage is found in some areas, mostly on the opening edge and in the folded section. The thick layer of soil has apparently protected the textile from insects.

UdeC-MA.07

Figure 8. Photo of UdeC-MA.07, as stored on the plastic tray.

UdeC-MA.07 refers to a group of objects, all stored together in a green plastic tray on Shelf 4, Ledge E of Classroom 7 (in Spanish: *Estante 4, Repisa E, Aula 7*). Three plastic bags are contained in this tray, each containing different groups of textiles, apparently grouped together according to type. The first bag contained only woven bands, the second bag contained fragmentary textiles of different characteristics and the third bag contained human hair, a human rib bone, some jute (?) objects and braids and a few fragmentary textiles in very poor condition, mixed with large amounts of dirt, soil and loose fibres.
For the purposes of this investigation, the objects have been catalogued as UdeC-MA.07.a, UdeC-MA.07.b and so forth.

UdeC-MA.07.a

Inventory number: UdeC-MA.07.a	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 430x35mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

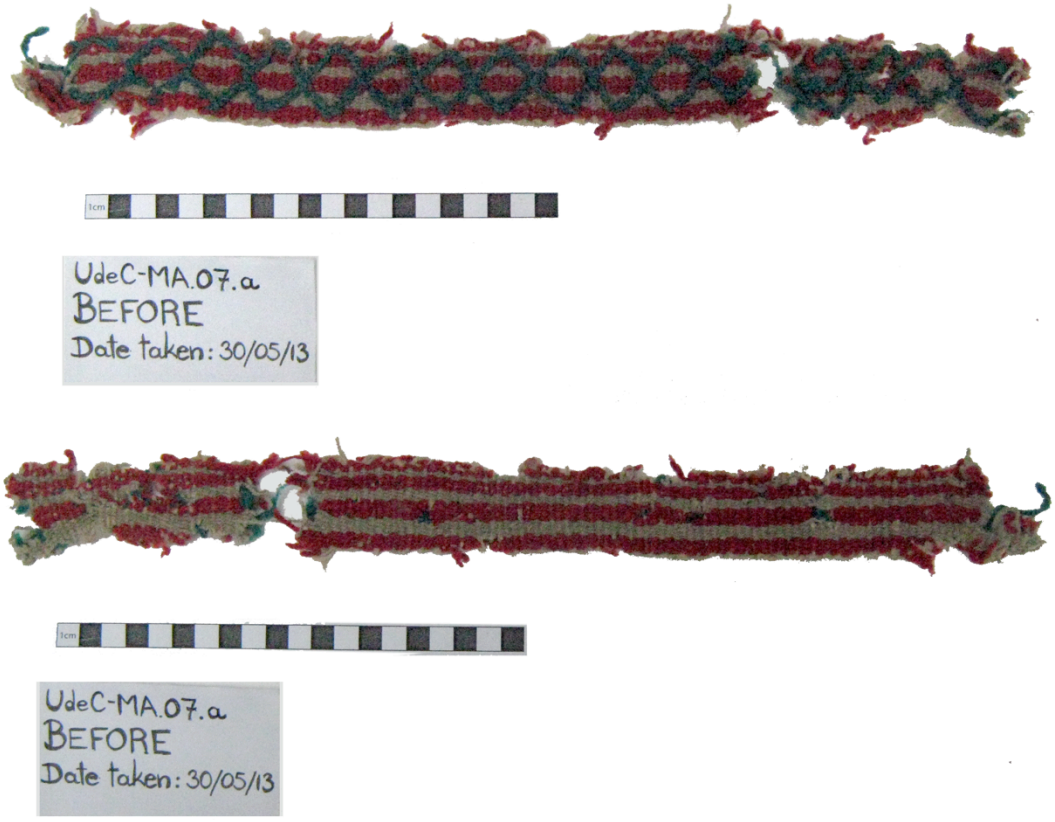

Figure 9. General photo of UdeC-MA.07.a, showing both sides.

Brief description: small woven band with horizontal stripes in red and natural white colour. A diamond shape embroidery in bright turquoise colour can be seen on the front side. Plain weave, warp-faced, both selvedges present, although original length of the band is unknown.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are a natural white colour, 2-ply (no twist, 'z'-plied) and 1.8mm thick. Thread count is 5 in 10mm.
- Warps are natural white and red, 2-ply ('s'-spun, 'z'-plied). Red is 1.8mm thick while white is 1.2mm thick. Each stripe is nine warps wide (about 7mm).
- Embroidery thread is bright turquoise and is not visible from the reverse of the band (unless damaged). Comprises two threads, each 2-ply ('s'-spun, 'z'-plied) 'z'-twisted together.
- Selvedges are made with one warp of each colour twisted with one another while woven.

Condition report:

Soiling, discolouration and staining	- Object is not very soiled, mostly dust (making the colours a bit dull) and deposited soil coming from other objects. - No stains are found in this object.
Creasing and distortions	- Object is not very creased. - Weave is distorted where insect damage is present.
Structural damage	- Insect damage is found mostly around the edges of the band and particularly towards the right of the front side in figure 9. Areas of loss involve warp, weft and sometimes the embroidery thread as well.

UdeC-MA.07.b

Inventory number: UdeC-MA.07.b	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** good
Overall dimensions (lxw): 800x60mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

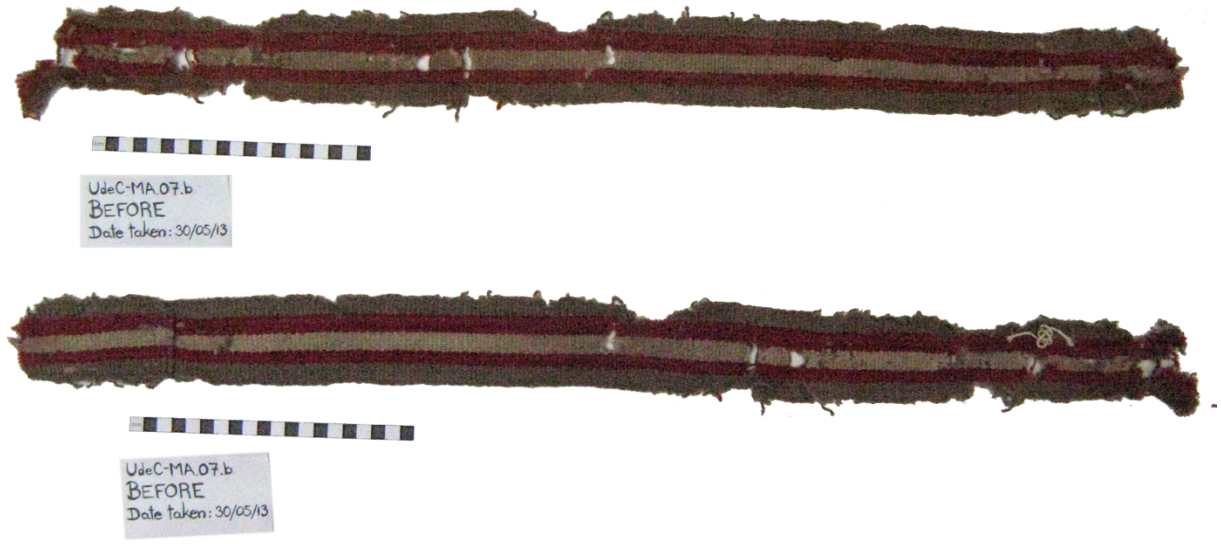

Figure 10. General photo of UdeC-MA.07.b, showing both sides.

Brief description: woven band with horizontal stripes in red, tan and natural white colour. Plain weave, warp-faced, both selvedges present, although original length of the band is unknown.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Wefts are tan colour, 2-ply (no twist, 'z'-plied) and 1.7mm thick. Thread count is 3.5 in 10mm.
- Warps are natural white, tan and red, 2-ply ('s'-spun, 'z'-plied). Red is 1.2mm thick, 12 in 10mm. White is 1.2mm thick, 16 in 10mm. Tan is same yarn as used for wefts, 12 in 10mm.

- Selvedges are made with two tan coloured warps twisted with one another while woven.
- Band presents two individual seams connecting it to a second band of same characteristics (or same band sewn to itself?). Thread seams to be the same as the white coloured warp.

Condition report:

Soiling, discolouration and staining	- Object is not very soiled, mostly dust (making the colours a bit dull) and deposited soil coming from other objects. - No stains are found in this object, although there is evidence of dye bleed of the red warps.
Creasing and distortions	- Object is not very creased. - Weave is distorted where insect damage is present.
Structural damage	- Insect damage is found mostly around the edges of the band. Areas of loss involve warp and weft.

UdeC-MA.07.c

Inventory number: UdeC-MA.07.c	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** good
Overall dimensions (lxw): 273x35mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Central Pre-Columbian cultures.

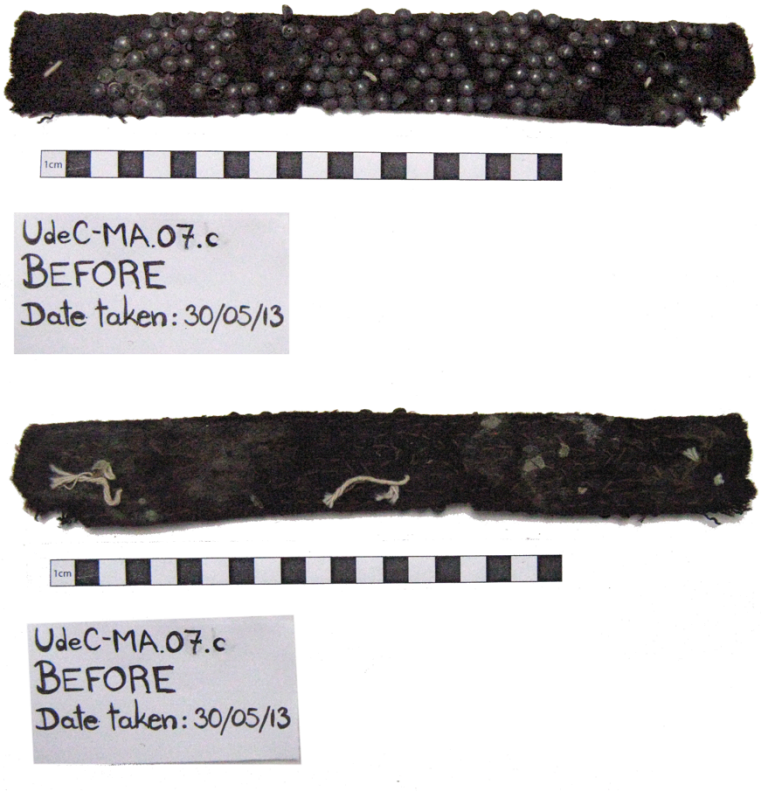

Figure 11. General photo of UdeC-MA.07.c, showing both sides.

Brief description: small woven band with metallic beads sewn forming a zig-zag design. Plain weave, warp-faced, both selvedges present, although original length of the band is unknown.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Warps are red-brown and black, placed 'one and one' creating a stripe pattern of sorts. Weave is so tight it's not noticeable unless observing up close. Both yarns are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 25 in 10mm.
- Wefts are the same as warps. Thread count is 8 in 10mm.
- The metallic beads are shaped like a dome. They are hollow and have two opposed holes for sewing onto the surface of the band. The thread used is a yellow 2-ply ('z'-spun, 's'-plied), 1mm thick; it looks brown from the front side.
- Has three individual stitches, visible from the back and one from the front where the beads are missing. Perhaps this band was once attached to something else (?). The sewing threads are white, 2-ply ('s'-spun, 'z'-plied), 1.5mm thick.

Condition report:

Soiling, discolouration and staining	- The beads have corroded, transferring onto the fibres a green-white colour, often obscuring the weave. Some of it has transferred towards the reverse side. - Object is particularly soiled on the reverse side, revealing white deposits and some 'clumpy' grey soil – porous, looks like clay. Also presents some sandy deposits, light brown in colour.
Creasing and distortions	- Object is not creased. - Distortions where insect damage is present.
Structural damage	- Insect damage is found in some areas, mostly on the narrow edges. - Many beads have come off, some are becoming loose. This occurs both due to the threads being damaged or worn out, and also due to damage of the beads themselves. - Due to corrosion, the beads have become damaged and often entirely broken.

UdeC-MA.07.d

Inventory number: UdeC-MA.07.d	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 1055x60mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

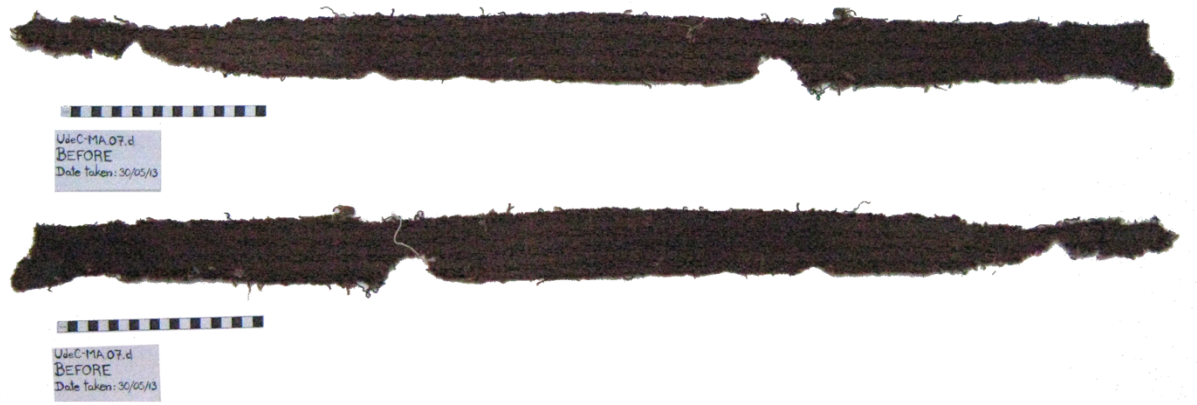

Figure 12. General photo of UdeC-MA.07.d, showing both sides.

Brief description: woven band, warp-faced (?), with a linear design in orange and black. The 'lines' consist in two fine parallel lines that open up into ellipses and then back to parallel (figure 13). No edges or selvedge are visible.

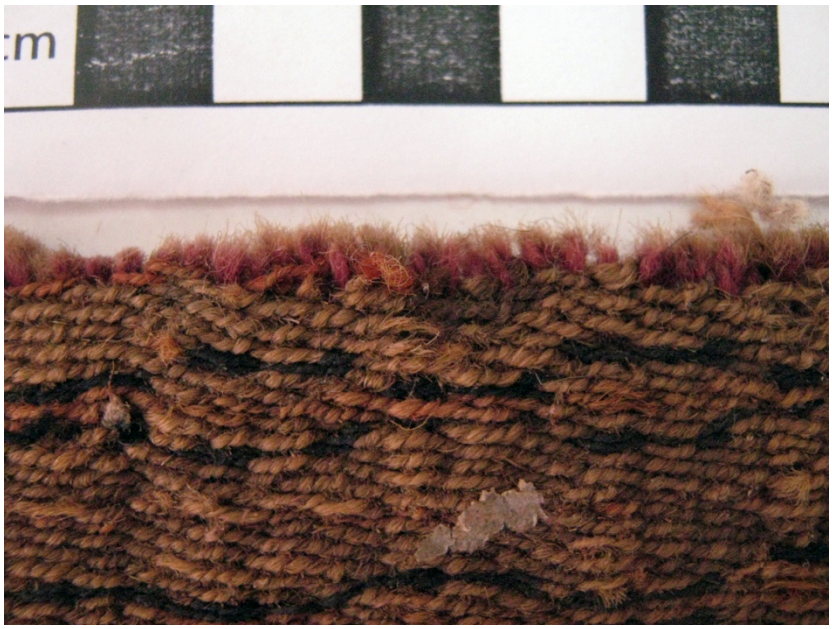

Figure 13. Detail photo of UdeC-MA.07.d, showing the linear design and colours.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (?). This is based on the observation of the other objects in the collection and the fact that most pre-Hispanic Chilean textiles are warp-faced[34]. Very densely woven.
- Warps are orange and black, creating the 'linear' design as described above. Both are 2-ply ('s'-spun, 'z'-plied) and 2mm thick. Thread count is 26 in 10mm.
- Wefts are burgundy, 2-ply ('s'-spun, 'z'-plied), 2mm thick. Thread count: 7 in 10mm.
- Presents two individual seams near the central section. Perhaps it was attached to something else at some point.
- The lack of selvedge or any edges presents the possibility that this band was cut from a larger woven piece.

Condition report:

Soiling, discolouration and staining	- Object is generally discoloured, particularly the orange warps have become brown. This is possibly due to light damage and soiling. - The colours become much lighter towards the most damaged edge, perhaps the insect damage involved in that edge had some influence on the dyes as well (?). - Black particulate soil (frass?) is present in this object, falling off when handled. - Some dark brown ingrained soiling is obscuring the design in some areas. - Some white, smooth deposits stuck onto the fibres in some areas. Looks almost like glue.
Creasing and distortions	- Object is not creased. - Weave has distorted around areas of loss, opening up and revealing the wefts.
Structural damage	- Insect damage is found throughout all edges of the object. - The 'left' edge (see top-left of figure 12) is particularly damaged, almost detaching a section from the main body of the band.

[34] Jordi Fuentes, *Tejidos Prehispánicos de Chile* (Santiago: Editorial Andrés Bello, 1965).

UdeC-MA.07.e

Inventory number: UdeC-MA.07.e	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 97x120mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 14. General photo of UdeC-MA.07.e, showing both sides.

Brief description: textile fragment, presents similar weave and design as **UdeC-MA.04**: even stripes, light brown and dark brown in colour. One selvedge (?) is partially present, enforced with a decorative green and dark brown 'blanket' stitch.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (based on the resemblance with **UdeC-MA.04**).
- Warps are dark brown and light brown. Both yarns are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 42 in 10mm.
- Wefts are the same as warps (light brown). Thread count is 7 in 10mm.
- There is a remnant of a finished edge that is thought to be the selvedge. Presents some green, dark brown, yellow and red threads but it is unknown if these last two colours were also part of the finishing stitch (figures 15 and 16).

Figure 15. Detail of UdeC-MA.07.e, showing the ‘blanket stich’ finish on what’s thought to be the selvedge.

Figure 16. Detail of UdeC-MA.07.e, showing the remnant of yellow and red yarns.

Condition report:

Soiling, discolouration and staining	- White deposits, same present in other textiles: dusty, ingrained on the surface. - Light brown, sandy soil and dust are easily coming off when handling.
Creasing and distortions	- Object is very creased and overall distorted due to insect damage and sharp creases.
Structural damage	- Insect damage around the edges. - Relatively large hole in the central area, near one of the edges, provoked by insects as well. - The coloured stitches on the edge are very scarce and almost completely gone, damaged by insects. - Fibres are very brittle and dry.

UdeC-MA.07.f

Inventory number: UdeC-MA.07.f	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 80x110mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

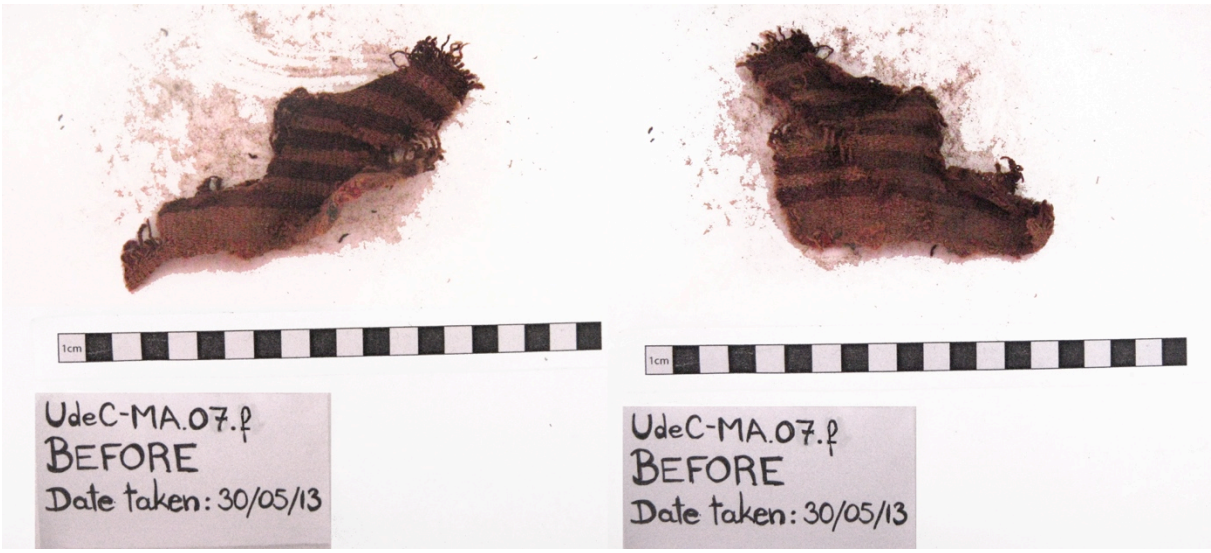

Figure 17. General photo of UdeC-MA.07.f, showing both sides.

Brief description: textile fragment, presents similar weave and design as **UdeC-MA.04**: even stripes, light brown and dark brown in colour. One selvedge (?) is present, enforced with a decorative 'blanket' stitch in red, green and yellow. Possibly part of the same textile as **UdeC-MA.07.e** (?).

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (based on the resemblance with **UdeC-MA.04**).
- Warps are dark brown and light brown. Both yarns are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 42 in 10mm.
- Wefts are the same as warps (light brown). Thread count is 7 in 10mm.
- There is a remnant of a finished edge that is thought to be the selvedge, same as found in **UdeC-MA.07.e**. Presents some green, yellow and red threads (figure 18).

Figure 18. Detail of UdeC-MA.07.f, showing the 'blanket stitch' finish on what's thought to be the selvedge.

Condition report:

Soiling, discolouration and staining	- White deposit, same present in other textiles: dusty, ingrained on the surface. - Light brown, sandy soil and dust are easily coming off when handling.
Creasing and distortions	- Object is very creased and overall distorted due to insect damage and sharp creases.
Structural damage	- Insect damage around the edges. - A tear comes from one of the edges towards the center, diagonally, provoked by insect damage related to the weakening of the fibres. The wefts become visible. - Fibres are very brittle and dry.

UdeC-MA.07.g

Inventory number: UdeC-MA.07.g	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 80x143mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 19. General photo of UdeC-MA.07.g, showing both sides.

Brief description: textile fragment, presents similar weave and design as **UdeC-MA.04**: even stripes, light brown and dark brown in colour. This is a corner of a larger piece, with two edges visible decorated with a sewn woven band.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (based on the resemblance with **UdeC-MA.04**).
- Warps are dark brown and light brown. Both yarns are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 42 in 10mm.
- Wefts are the same as warps (light brown). Thread count is 7 in 10mm.
- Edges seem to have the same finish as **UdeC-MA.07.e** and **UdeC-MA.07.f**.
- The visible corner is decorated with a woven band in multiple colours (red, yellow, green, blue); looks like a braid-structured weave. The band is applied on both sides of the textile (four 'bands' in total, see figure 20).

- There is a fifth band on one of the sides, looks very damaged and has almost disappeared completely.
- The band is 1.5cm at its widest, and 7.4cm at its longest (equal both vertically and horizontally). This decorated edge could belong to a tunic, perhaps.
- The bands' threads are very fine, and its seams to the object are not clearly visible.

Figure 20. Detail of UdeC-MA.07.g, showing a close up of the decorative band attached to the corner of the textile.

Condition report:

Soiling, discolouration and staining	- Edges opposite to the corner are particularly soiled with a dark brown, thick later of dirt. - Dirt deposits (dark and light brown) found within the creases. - There's evidence of dye bleed on one of the bands, the red has bled onto the yellow. - Salty, white deposits also found throughout the object.
Creasing and distortions	- Object is heavily creased, making its observation quite difficult.
Structural damage	- Insect damage throughout the object, particularly around the two edges opposite to the decorated corner. - The edges' 'blanket stitch' is almost entirely gone due to insect damage. - Fibres are very brittle and dry.

UdeC-MA.07.h

Inventory number: UdeC-MA.07.h	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 110x210mm	**Date recorded:** 30/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 21. General photo of UdeC-MA.07.h, showing both sides.

Brief description: textile fragment, presents similar weave and design as **UdeC-MA.01**, but coarser. Colourful striped design in red, blue, green, yellow, orange and burgundy; probably warp-faced as presents similar structure. No edges or selvedge present.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (based on the resemblance with **UdeC-MA.01**).
- Wefts are dark brown, 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 6 in 10mm.
- Warps are 2-ply ('s'-spun, 'z'-plied) and 1 mm thick. Thread count is 30 in 10mm.

Condition report:

Soiling, discolouration and staining	- Some white deposits, orange coloured sandy deposits and dark brown ingrained soiling that obscures the colours. - Colours look quite bright in general, only obscured by soil. No fading is observed. - The colours on one side look brighter, perhaps protected from light.
Creasing and distortions	- Object is heavily creased and stiff making its observation quite difficult. - Insect damaged areas have distorted the weave.
Structural damage	- Insect damage throughout the object. - Tears can be found coming from the damaged edges, provoked by insect damage. - Fibres are very brittle and dry.

UdeC-MA.07.i | j | k | l | m

Inventory number: UdeC-MA.07.i | UdeC-MA.07.j | UdeC-MA.07.k | UdeC-MA.07.l | UdeC-MA.07.m		**Period:** unknown
Location: Universidad de Concepción – Aula 7		**General condition:** poor
Overall dimensions (lxw) in mm:		**Date recorded:** 30/05/2013
UdeC-MA.07.i: 67x75 UdeC-MA.07.j: 125x113 UdeC-MA.07.k: 70x130	UdeC-MA.07.l: 60x62 UdeC-MA.07.m: 32x45	
Provenance: donated to the Anthropology Institute back in the 1970's.		**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 22. General photo of UdeC-MA.07.i, j, k, l and m, showing both sides.

Brief description: group of five small textile fragments, grouped for the purposes of this dissertation as they present the same soiling and damage characteristics. No selvedge or edges visible. Similar in construction and design to **UdeC-MA.01**.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Objects are plain weave, warp-faced (based on their resemblance with **UdeC-MA.01**).
- Wefts are dark brown, 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 6 in 10mm.
- Warps are 2-ply ('s'-spun, 'z'-plied) and 1 mm thick. Thread count is 30 in 10mm.
- The stripe design is the same as **UdeC-MA.07.h** in all fragments, except for what's visible of **UdeC-MA.07.j**, which presents a mostly red and green design.

Condition report:

Soiling, discolouration and staining	- Some white deposits, orange coloured sandy deposits and dark brown ingrained soiling that obscures the colours. - Colours look quite bright in general, only obscured by soil. No fading is observed. - The colours on one side look brighter, perhaps protected from light.
Creasing and distortions	- Objects are heavily creased and stiff making their observation quite difficult. - Insect damaged areas have distorted the weave.
Structural damage	- Insect damage throughout the objects. - Tears can be found coming from the damaged edges in **UdeC-MA.07.j**, **k**, **l** and **m**. - **UdeC-MA.07.j** has a smaller fragment almost completely detached from it, hanging from a single weft. - Fibres are very brittle and dry.

UdeC-MA.07.n

Inventory number: UdeC-MA.07.n	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 155x85mm	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

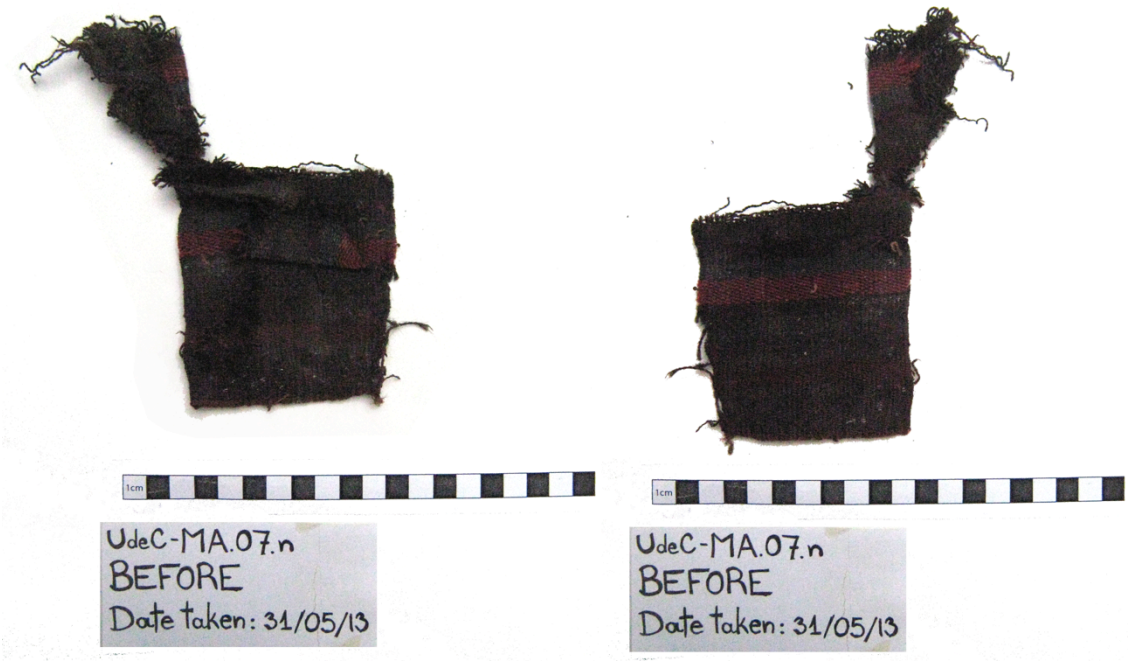

Figure 23. General photo of UdeC-MA.07.n, showing both sides.

Brief description: small, rectangular bag, plain weave, warp-faced, showing a striped design in blue, red, black, brown and red. Design is the same on both sides, as it is folded in one side. Has one seam on the bottom ('sides' and 'bottom' refers to their location as viewed on figure 23).

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (it is thought the selvedge is hid on the seam).
- Object is folded, and sewn to itself on the 'bottom' with blanket stitch in light brown colour (figure 24).

- Wefts are dark brown, 2-ply (‘s’-spun, ‘z’-plied) and 1mm thick. Thread count is 7 in 10mm.
- Warps are 2-ply (‘s’-spun, ‘z’-plied) and 1 mm thick. Thread count is 28 in 10mm, although is tighter in some areas.
- One of the stripes presents a staggered design in blue and black (figure 25).

Figure 24. Detail of UdeC-MA.07.n, showing the seam.

Figure 25. Detail of UdeC-MA.07.n, showing the colour design in the blue/black stripe.

Condition report:

Soiling, discolouration and staining	- Some white deposits, orange coloured sandy deposits and dark brown ingrained soiling that obscure the colours. - Colours look quite bright in general, only obscured by soil. No fading is observed.
Creasing and distortions	- 'Top' section of object (see top of figure 23) is very creased and stiff making its observation quite difficult. - Insect damaged areas have distorted the weave.
Structural damage	- Insect damage throughout the object. - Fibres are very brittle and dry. - The 'top' section is particularly damaged (insects) and is almost detached from the main body (figure 26).

Figure 26. Detail of UdeC-MA.07.n, showing the 'top' section opened.

UdeC-MA.07.o

Inventory number: UdeC-MA.07.o	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 150x90mm	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 27. General photo of UdeC-MA.07.o, showing both sides.

Brief description: textile fragment, plain weave, green coloured. No edges or selvedge present.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (?).
- Wefts are dark brown, 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 6 in 10mm.
- Warps are green (some lighter, some darker), 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 31 in 10mm.
- No selvedge or edges are present.

Condition report:

Soiling, discolouration and staining	- White soil looks 'printed' on the textile, following the creases of the object. - Sandy soil (light brown) found mostly within the creased areas, accumulated over time. - Colour varies depending on soil type. - Most soiled areas are particularly stiff.
Creasing and distortions	- Object is heavily creased and overall distorted due to insect damage and sharp creases.
Structural damage	- Insect damage around the edges. - Relatively large hole in the central area, presents tears towards the sides following the creases of the object. - Fibres are very brittle and dry, making it hard to open out for observation.

UdeC-MA.07.p

Inventory number: UdeC-MA.07.p	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw) in mm: Larger fragment: 15x60 Smaller fragment: 23x40	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 28. General photo of both fragments classified as UdeC-MA.07.p, showing both sides.

Brief description: two small textile fragments, thought to belong to the same fabric thus catalogued together. Plain weave, green coloured. Perhaps part of **UdeC-MA.07.o**, but the green colour is not exactly the same. No edges or selvedge present.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (?).
- Wefts are dark brown, 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 6 in 10mm.
- Warps are green (some lighter, some darker), 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 31 in 10mm.
- No selvedge or edges are present.

Condition report:

Soiling, discolouration and staining	- Objects are heavily soiled, presenting mainly dark brown soiling. - Some small white deposits are present. - Most soiled areas are very stiff.
Creasing and distortions	- Objects are not creased. - Distortions occur in areas of insect damage.
Structural damage	- Insect damage around the edges. - Fibres are very brittle and dry; very stiff.

UdeC-MA.07.q

Inventory number: UdeC-MA.07.q	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 250x345mm	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 29. General photo of UdeC-MA.07.q, showing both sides.

Brief description: textile fragment, presents similar weave and design as **UdeC-MA.04**: even stripes, light brown and dark brown in colour. Two edges present (unsure if selvedges).

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced (based on the resemblance with **UdeC-MA.04**).
- Warps are dark brown and light brown. Both yarns are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 42 in 10mm.
- Wefts are the same as warps (light brown). Thread count is 7 in 10mm.
- There are remnants of finishing on the edges, same as found in **UdeC-MA.07.e**. Presents some green and red threads (figure 30).

Figure 30. Detail of UdeC-MA.07.q, showing the remaining coloured threads found on one of the edges.

Condition report:

Soiling, discolouration and staining	- Object is heavily soiled, presenting many areas of white soil, sometimes turning 'grey' when mixed (?) with the black particulate soil. These areas are particularly stiff (figure 31). - Sandy light brown soil also present, obscuring the colours in some areas, ingrained in the fibres. Some has accumulated within the folds and creases, creating small clumps of material. - Some dark brown soiling also present, obscuring the striped design. - Colours vary throughout depending on the soil, but they seem quite bright in general.
Creasing and distortions	- Object is heavily creased and overall distorted due to insect damage and sharp creases.
Structural damage	- Insect damage around the edges, provoking tears towards the main body of the textile. - One third of the textile is held together by a small portion of weave (see bottom-left side of figure 29). - Some holes as well, all insect related. - Fibres are very brittle and dry; very stiff.

Figure 31. Detail of UdeC-MA.07.q, showing the 'grey' soil (top) in comparison with the white soil (bottom).

UdeC-MA.07.r

Inventory number: UdeC-MA.07.r	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** poor
Overall dimensions (lxw): 160x20mm (width measured on the section of the rope that hasn't unraveled)	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 32. General photo of UdeC-MA.07.r, showing both sides.

Brief description: rope, unravelling on one side (top of figure 32).

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is a rope, consisting of one thick 2-ply ('z'-twist, 's'-plied), tightly twisted. It is then twisted on itself, generating the visible 'edge'. A second, thinner rope (2-ply, 'z'-twisted, 's'-plied) is attached to this edge, and then braided with the twisted, thicker rope (figure 33).

Figure 33. Detail of UdeC-MA.07.r, showing the 'edge' where the braid begins.

Condition report:

Soiling, discolouration and staining	- Object is heavily soiled, mostly light-brown/orange in colour. The soil is very thick, sometimes obscuring the rope's construction. - Soil is very dusty on the surface and comes off easily, but is also holding the fibres in place. - Other fibres and human hair have attached to the soil, as it was stored together with other objects and a human hair braid.
Creasing and distortions	- Object is bent and is not very flexible due to soiling and desiccation of the fibres.
Structural damage	- No sign of insect damage. - One edge of the rope is unraveling, becoming undone and releasing fibres and soil when handled. - Fibres are very degraded and brittle, coming off where then can (i.e. thinner layer of soil).

UdeC-MA.07.s

Inventory number: UdeC-MA.07.s	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** fair
Overall dimensions (lxw): 200x160mm	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 34. General photo of UdeC-MA.07.s, showing both sides.

Brief description: textile fragment, presents similar weave and design as **UdeC-MA.04**: even stripes, light brown and dark brown in colour. One selvedge present, presenting a undone seam.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

- Object is plain weave, warp-faced.
- Warps are dark brown and light brown. Both yarns are 2-ply ('s'-spun, 'z'-plied) and 1mm thick. Thread count is 42 in 10mm.
- Wefts are the same as warps (light brown). Thread count is 7 in 10mm.
- There are remnants of a seam in the 'bottom' (see bottom of figure 34) in a dark brown coloured thread.

Condition report:

Soiling, discolouration and staining	- Object is heavily soiled. Light brown soil covers most of it, obscuring the colours and design. - Some crushed leaves and chipped wood is found attached to the fibres in some areas, due to storage with other objects in the same bag.
Creasing and distortions	- Object is quite creased, but can be easily opened as can be seen in figure 34. - Distorted areas present around insect damage.
Structural damage	- Insect damage around the edges. - Fibres are very brittle and dry, making the textile quite stiff overall.

UdeC-MA.07.t

Inventory number: UdeC-MA.07.t	**Period:** unknown
Location: Universidad de Concepción – Aula 7	**General condition:** very poor
Overall dimensions (lxw): 350x235mm, measured all objects together.	**Date recorded:** 31/05/2013
Provenance: donated to the Anthropology Institute back in the 1970's.	**Attribution:** unknown, possibly belongs to one of the Northern Pre-Columbian cultures.

Figure 35. General photo of the fragments classified as UdeC-MA.07.t.

Brief description: 7 textile fragments, unknown if part of the same fabric. It is thought only one of the fragments isn't, as it presents a finer weave structure.

Current location:

Shelf 4, Ledge E inside Classroom 7 of the Anthropology School at University of Concepción (in Spanish: *Estante 2, Repisa E, Aula 7*).

Technique of construction:

Main fragment (left of figure 35)

- Object is plain weave, warp-faced (?).
- Warps are dark brown, almost black. 2-ply ('s'-spun, 'z'-plied) and 2mm thick. Thread count is 10 in 10mm.
- Wefts are 2-ply of the yarns used as warps, 'z'-twisted together forming a thick 4mm thread. Thread count is 4 in 10mm.
- No edges or selvedge present.

Smaller fragment (thought not to be part of the main fragment)

- Also plain weave, warp-faced (?).
- Much finer weave; half light brown and half dark brown in colour (thick stripes design, perhaps?).
- Warps are either light or dark brown, 2-ply ('s'-twist, 'z'-plied), 1mm thick. Thread count is 18 in 10mm.
- Wefts are dark brown, 2-ply ('s'-twist, 'z'-plied), 1mm thick. Thread count is 6.5 in 10mm.
- No edges or selvedge present.

Other fragments are heavily soiled, damaged and very small, weave structure could not be determined but the yarns seem to be the same, although slightly finer, as the *main fragment*.

Condition report:

Soiling, discolouration and staining	- Objects are heavily soiled. - Colours are overall obscured by soil: dark brown and some light brown areas. - Some clumps of light brown soil can be found attached to the yarns. - Crushed leaves and chipped wood are found attached to the fibres in some areas, due to storage with other objects in the same bag. - Some human hair is also attached in areas, as this object was stored with a human hair braid.
Creasing and distortions	- Objects are very creased and distorted due to insect damage and poor storage conditions, although some might also be a result of the burial environment.
Structural damage	- Insect damage overall. - Objects are extremely fragile and brittle. Massive fibre loss when handled. - Fibres are very dry, brittle and often very stiff due to ingrained soiling.

Appendix III:

Condition details – tables and images

List of Contents and Illustrations

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile.

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.01	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments: material becomes stiff; soiling is ingrained. Particularly towards the central area. In some areas it looks almost like salt deposits, but no magnification is available for confirmation.			Comments: particularly towards the central area, obscuring original colours. Ingrained soiling.			Comments:			Comments:		
UdeC-MA.02	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: material becomes stiff; soiling is ingrained. The brown section seems to be more soiled than the red. In some areas, it seems to have been “printed”, revealing clean areas when creases are extended.			Comments:			Comments: present particularly in the brown section of textile. Soiling in ingrained, obscuring original colours, particularly towards the central area. Soil is sandy, thicker in some areas, at times presenting small clumps.			Comments:		
UdeC-MA.03	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: found throughout the textile on both sides.			Comments:			Comments: present mostly on the inside of the textile along with many dead insects. Might the soil be related to them?			Comments:		

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.04	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO
	Comments: same as observed previously, soil seems "printed" and clean areas are revealed when creases are opened. Slightly more evident on the inside, particularly on the proper left shoulder area.			Comments: present on both sides of object, seems to have passed through the thick weave. Very ingrained.			Comments: soil is almost "muddy", very dry and presents cracks in some areas, creating holes and cracks on the fabric. Could this be human remains?			Comments: deposited soil, falls off when object is handled. Could be frass.		
UdeC-MA.05	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO
	Comments: some deposits, same as above.			Comments: observed throughout the entire object, is ingrained and obscures the original colours.			Comments:			Comments: deposited soil, falls off when object is handled. Could be frass.		
UdeC-MA.06	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: some deposits, same as above.			Comments:			Comments: observed throughout the outer side of the object, is ingrained and obscures the original colours, making the fabric very stiff and brittle. It is very difficult to open the bag to observe the inside.			Comments:		
UdeC-MA.07.a	Present?	YES	**NO**	Present?	YES	**NO**	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments:			Comments:			Comments:		
UdeC-MA.07.b	Present?	YES	**NO**	Present?	YES	**NO**	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments:			Comments:			Comments:		

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.07.c	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: present on reverse side, some small white deposits.			Comments:			Comments: seems porous, almost like clay, "muddy". Present only on reverse side of the band. Also present as sandy deposits like observed on UdeC-MA.02.			Comments:		
UdeC-MA.07.d	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO
	Comments: a few smooth deposits stuck onto the fibres. Almost like glue.			Comments: ingrained soiling, obscures the design and colours in some areas.			Comments:			Comments: deposited soil, falls off when object is handled. Could be frass.		
UdeC-MA.07.e	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: same as observed in other textiles. Looks almost "printed", although it is ingrained in the fibres.			Comments:			Comments: overall very soiled and cracked, comes off while handling. Ingrained soiling makes the fibres very brittle and dry.			Comments:		
UdeC-MA.07.f	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: some white deposit present, same as observed previously.			Comments:			Comments: overall very soiled, same as UdeC-MA.07.e.			Comments:		
UdeC-MA.07.g	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously.			Comments:			Comments: overall very soiled. Many dirt deposits accumulated within folds and creases. The edge is particularly soiled, layered.			Comments:		

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.07.h	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously. More is visible in the "reverse" side.			Comments: ingrained, obscures the colours. Areas where the fabric has broken seem to have degraded faster due to this type of soiling; the yarns look almost cut.			Comments: overall very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is very difficult to open up for observation; some loose warps have become attached to the main fabric by soiling. Sandy deposits present, some almost orange in colour.			Comments:		
UdeC-MA.07.i	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously. More is visible in the "reverse" side.			Comments: ingrained, obscures the colours. Areas where the fabric has broken seem to have degraded faster due to this type of soiling; the yarns look almost cut.			Comments: overall very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is very difficult to open up for observation.			Comments:		
UdeC-MA.07.j	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously. More is visible in the "reverse" side.			Comments: ingrained, obscures the colours. Areas where the fabric has broken seem to have degraded faster due to this type of soiling; the yarns look almost cut.			Comments: overall very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is very difficult to open up for observation.			Comments:		

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.07.k	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously. More is visible in the "reverse" side.			Comments: ingrained, obscures the colours. Areas where the fabric has broken seem to have degraded faster due to this type of soiling; the yarns look almost cut.			Comments: overall very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is very difficult to open up for observation.			Comments:		
UdeC-MA.07.l	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously. More is visible in the "reverse" side.			Comments: ingrained, obscures the colours. Areas where the fabric has broken seem to have degraded faster due to this type of soiling; the yarns look almost cut.			Comments: overall very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is very difficult to open up for observation.			Comments:		
UdeC-MA.07.m	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: white deposits overall, same as observed previously. More is visible in the "reverse" side.			Comments: ingrained, obscures the colours. Areas where the fabric has broken seem to have degraded faster due to this type of soiling; the yarns look almost cut.			Comments: overall very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is very difficult to open up for observation.			Comments:		

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.07.n	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: some white deposits present, same as observed previously.			Comments:			Comments: overall soiled, not as much as above. Ingrained, making the fibres very stiff and brittle. Fragment is difficult to open up for observation.			Comments:		
UdeC-MA.07.o	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: transitions from the light-brown soil towards the white ingrained deposits observed in other textiles. As with the others, this soil follows the creases and folds of the textile.			Comments:			Comments: very soiled. Ingrained, making the fibres very stiff and brittle. Fragment is difficult to open up for observation. Sandy soil mostly found within creased areas, accumulated.			Comments:		
UdeC-MA.07.p	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments: some white deposits present.			Comments: heavily soiled. Ingrained, making the fibres very stiff.			Comments:			Comments:		
UdeC-MA.07.q	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO
	Comments: many areas appear white, sometimes grey where it has mixed with the black soil.			Comments: heavily soiled. Ingrained, making the fibres very stiff. Fragment is difficult to open up for observation but appears quite robust in general.			Comments:			Comments: deposited soil, falls off when object is handled. Could be frass. In some areas it has “blended in” with the white soil.		

Table 1. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	White soil /discolouration			Dark brown soil / discolouration			Light brown soil / discolouration			Black particulate soil		
Textile nº												
UdeC-MA.07.r	Present?	YES	**NO**	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments:			Comments: "muddy" soil, almost like clay. It seems to be preventing the rope from unraveling, obscuring the fibres and construction details as well. Very dusty soil, almost orange in colour.			Comments:		
UdeC-MA.07.s	Present?	YES	**NO**	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments:			Comments: heavily soiled, obscuring the design and colours almost completely.			Comments:		
UdeC-MA.07.t	Present?	YES	**NO**	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments:			Comments: all 7 fragments are heavily soiled and degraded, turning to dust when handled. Soil is both ingrained and deposited, very dry and obscuring the weave completely in some areas.			Comments:		

Figure 1. Photographic examples of the types of soiling described in Table 1.

1. Table 1 Discussion

- 21 textiles (80.8%) present the white soil/discolouration in two different variants: one appears to shine under the light like salt deposits, and one is smooth and looks almost like glue (this last one is only present in one textile). They present an almost off-white colour that seems to have been 'printed' onto the creased textiles, revealing clean areas when opening the folds.
- This white soil is believed to have occurred after excavation, mainly because it is present in most of the textiles. Considering they don't belong to the same archaeological site, it would be odd to present the same type of soil in different burial environments, but this is but an unconfirmed assumption. Also, there is literature regarding sodium-based white soil in poorly stored archaeological textiles, although it is unlikely to be the same soil due to different geographical location, the described soil seems very similar to that found on the observed textiles.[35]
- 12 textiles (46.2%) present the dark brown soil/discolouration. This soil is believed to have occurred in the burial environment and as a combination of the bodily fluids and the soil present underground. It would be consistent with the body lying on top of the soiled areas, and is present on the 'large textiles' mostly.
- There is also evidence of what could be accelerated fibre degradation in the areas affected with the dark brown soil, which could also indicate the presence of other alkaline compounds other than dirt.
- 19 textiles (73.1%) present the light brown soil/discolouration. It is mostly sandy, consistent with a dry burial environment in the desert, sometimes provoking small clumps lightly attached to the fibres. It is also sometimes present in a 'muddy' appearance, possibly due to interaction with humidity and perhaps bodily fluids.
- The 'muddy' version of this soil presents cracks that have damaged the fibres provoking holes and cracks in the fabric itself.
- Only four textiles (15.4%) present the black particulate soil. It is thought perhaps this could be frass, but the author is unsure since there is evidence of insect damage on all textiles. It could be possible, as this soil is not attached to the fibres, that those textiles that do present it were located at the bottom of the ceramic vase, so the

[35] Margareta Nockert and Tommy Wadsten, "Storage of Archaeological Textile Finds in Sealed Boxes," *Studies in Conservation* 23, no. 1 (1978): 38-41.

frass naturally fell in their direction. The author was able to look at references of damaged pre-Columbian textiles stored at the Antofagasta Museum (in Spanish: *Museo de Antofagasta*) that present current insect damage, and the black particulate soil seems to be the same.[36]

[36] Personal communication with Ms. Verónica Díaz Vilches, collection manager at the Antofagasta Museum, July 2013.

Table 2. Shows general damage characteristics according to soiling and discolouration present on each textile.

Type of damage	Cobwebs			Dust			Other (seldom found soil)			Dye bleed		
Textile nº												
UdeC-MA.01	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments: thought to have occurred after excavation, cobwebs can be found as small patches throughout the surface and on both sides of the textile.			Comments: dust deposition is generalized as a result of poor storage conditions (textile is not covered in any way).			Comments:			Comments:		
UdeC-MA.02	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: some cobwebs visible on “reverse” side.			Comments: generalized as a result of poor storage conditions, textile is partially covered in Tyvek®. Thick layer of dust present on the edges.			Comments: dusty red soil, possibly clay. Covers dead insects as well; it occurred after insect damage had stopped.			Comments:		
UdeC-MA.03	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments: some cobwebs found on both sides of textile.			Comments: generalized as a result of poor storage conditions, textile is partially covered in Tyvek®.			Comments:			Comments:		
UdeC-MA.04	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments: some cobwebs found on both sides of textile.			Comments: generalized as a result of poor storage conditions, textile is partially covered in Tyvek® and cardboard.			Comments:			Comments:		

Table 2. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	Cobwebs			Dust			Other (seldom found soil)			Dye bleed		
Textile nº												
UdeC-MA.05	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: dust deposition is generalized as a result of poor storage conditions (textile is not covered in any way).			Comments:			Comments:		
UdeC-MA.06	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized as a result of poor storage conditions (textile is not covered in any way).			Comments:			Comments:		
UdeC-MA.07.a	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: what seems to be ingrained dust makes the object look grey.			Comments:			Comments:		
UdeC-MA.07.b	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO
	Comments:			Comments: generalized as a result of poor storage conditions (textile is within an open plastic bag).			Comments:			Comments: red dye has bled slightly on one side, visible onto the cream stripes of the textile.		
UdeC-MA.07.c	Present?	YES	**NO**	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments: generalized as a result of poor storage conditions.			Comments: green/white metal corrosion due to degradation of silver (?) beads attached to the band.			Comments:		

Table 2. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	Cobwebs			Dust			Other (seldom found soil)			Dye bleed		
Textile nº												
UdeC-MA.07.d	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized as a result of poor storage conditions.			Comments:			Comments:		
UdeC-MA.07.e	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: deposited thick layer of dust overall.			Comments:			Comments:		
UdeC-MA.07.f	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: deposited thick layer of dust overall.			Comments:			Comments:		
UdeC-MA.07.g	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	**YES**	NO
	Comments:			Comments: generalized.			Comments:			Comments: evidence of dye bleed in one of the multi-coloured bands.		
UdeC-MA.07.h	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized for objects **h** to **q**.			Comments:			Comments:		
UdeC-MA.07.i	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.j	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.k	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.l	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		

Table 2. Shows general damage characteristics according to soiling and discolouration present on each textile (continued).

Type of damage	Cobwebs			Dust			Other (seldom found soil)			Dye bleed		
Textile nº												
UdeC-MA.07.m	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.n	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.o	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.p	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.q	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: generalized.			Comments:			Comments:		
UdeC-MA.07.r	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments:			Comments: deposited thick layer of dust overall.			Comments:			Comments:		
UdeC-MA.07.s	Present?	YES	**NO**	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments: deposited thick layer of dust overall.			Comments: crushed dry leaves and wooden chips, partially attached to the fibres.			Comments:		
UdeC-MA.07.t	Present?	YES	**NO**	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments: deposited thick layer of dust overall.			Comments: crushed dry leaves and wooden chips, loose fibres and human hair are partially attached to the extremely degraded textile, making it difficult to handle.			Comments:		

Figure 2. Photographic examples of the types of soiling described in Table 2.

Cobwebs	Red soil /discolouration	Crushed leaves and wooden chips	Dye bleed
			
			
		Metallic corrosion	

2. Table 2 Discussion

- Only four textiles (15.4%) present cobwebs throughout their surface. These are only those classified under the 'large textile' category, which is very curious and consistent with the idea that they occurred after excavation. Perhaps they were placed on top (or bottom) of everything else within the ceramic vase, being more prone to spiders finding their way in (?). The original placement of the textiles within the vase is unknown, so this is only an assumption.
- The cobwebs themselves do not present any damage to the fibres, and can be easily removed with a brush.
- All textiles (100%) present dust in different amounts and densities. This is due to poor storage conditions both while the textiles were cramped inside the vase and after removal, since they are not covered or sealed in any way, exposed to the environment and to other objects within the storeroom.
- Only two textiles (7.7%) present crushed leaves and wooden chips. These are most likely from the environment from which they were found (maybe not burial). Both textiles are found within the same plastic bag, stored with very large amounts of loose fibres and human hair along with more chips and leaves. Unknown if all items found within this bag belong to the same archaeological site.
- Only two textiles (7.7%) present dye bleed. In both cases the red has bled onto lighter colours (yellow and natural white). On one of them, the blue has also bled slightly (**UdeC-MA.07.g**).
- The red soil was only found on **UdeC-MA.02**. As described, is seems to be some sort of clay and has covered dead insects as well as the fabric, so it is thought to have occurred after the infestation.
- Corrosion was found only on **UdeC-MA.07.c**, the only object that presents metallic decorations.

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile.

Type of damage	Creases and distortions			Insect damage			Areas of loss / Structural damage			Other (seldom found)		
Textile nº												
UdeC-MA.01	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO
	Comments: object is very creased. Although some of these folds and creases are possibly from the burial environment, most of it is believed to have occurred after excavation, when the textile was cramped with the others inside a ceramic vase.			Comments: insect damage found throughout the textile; warps seem to have been affected by insects more than the warps. Seems to have occurred after excavation – moths.			Comments: multiple tears are found, some right from the edge, other within the fabric, possibly as a consequence of insect damage. The other edge is not present; possibly more than half of the textile is missing. Unknown how large the textile was originally.			Comments: the central area is particularly fragile and stiff. The soil seems to have weakened the fibres in that section to the point of disintegration – perhaps decomposition fluids where the body laid on top of the textile (?).		
UdeC-MA.02	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO
	Comments: object is very creased. The red section looks distended and stretched out, revealing the wefts. This probably occurred when the textile was being used, before burial, as is consistent with the re-woven areas. Some distorted areas provoked by insect damage and subsequent tearing of the weakened fibres.			Comments: insect damage found throughout the textile, distorting the weave.			Comments: multiple tears are found, possibly as a consequence of insect damage and some, perhaps, by wear. Both selvedges show extensive damage due to wear and insects, with loss of both warps and wefts.			Comments: re-woven areas are all located on the red section. It is likely that the red dye used at the time provoked the accelerated deterioration of the fibres in comparison with the brown. Re-weaving includes both warps and wefts in thicker yarns that often have discoloured different than the originals.		

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile (continued).

Type of damage	Creases and distortions			Insect damage			Areas of loss / Structural damage			Other (seldom found)		
Textile nº												
UdeC-MA.03	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: object is very creased. Although some of these folds and creases are possibly from the burial environment, most of it is believed to have occurred after excavation, when the textile was cramped with the others inside a ceramic vase.			Comments: overall damaged by insects, weakening the fibres of both warp and weft.			Comments: multiple tears are found, possibly as a consequence of insect damage and some, perhaps, by wear. One edge is missing. Towards that side, the textile presents extensive insect damage and looks more fragmentary.			Comments:		
UdeC-MA.04	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: object is quite creased but not as much as **01**, **02** and **03**.			Comments: overall damaged by insects, the 'back' of the tunic more than the 'front'. The back's bottom edge and shoulders area are the most affected. Areas of loss involve both warp and weft.			Comments: holes and cracks in the fibres due to the stiff light-brown soiling. Some tears, possibly provoked by insect damage weakened fibres.			Comments:		
UdeC-MA.05	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**	Present?	YES	**NO**
	Comments: object is not too creased but it's so stiff that the fold and seams are hard to open out to examine the inside of the bag.			Comments: Insect damage is found in some areas, mostly affecting the warps.			Comments:			Comments:		

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile (continued).

Type of damage	Creases and distortions	Insect damage	Areas of loss / Structural damage	Other (seldom found)
Textile nº				
UdeC-MA.06	Present? **YES** NO Comments: object is heavily creased. Weave is distorted where insects have damaged the fibres and opened the weave due to the creases.	Present? **YES** NO Comments: insect damage is found in some areas, mostly on the opening edge and in the folded section. The thick layer of soil has apparently protected the textile from insects.	Present? **YES** NO Comments: opening edge is damaged and often missing entirely.	Present? YES **NO** Comments:
UdeC-MA.07.a	Present? **YES** NO Comments: presents distortions where damaged by insects. Object is not creased	Present? **YES** NO Comments: evidence of insect damage, particularly towards one of the edges.	Present? **YES** NO Comments: insect damage has provoked the band to split in two, held together by the embroidery thread. Band is incomplete and it is unknown how long it was originally.	Present? YES **NO** Comments:
UdeC-MA.07.b	Present? **YES** NO Comments: presents distortions where damaged by insects. Some creasing present on most damaged area, possibly as a result of its storage inside the vase and the desiccation of the fibres making them very stiff. Some coarse seam threads also distort the weave around them.	Present? **YES** NO Comments: evidence of insect damage, particularly towards one of the edges.	Present? **YES** NO Comments: a few holes where insects attacked. Band is incomplete and it is unknown how long it was originally.	Present? YES **NO** Comments:

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile (continued).

Type of damage	Creases and distortions	Insect damage	Areas of loss / Structural damage	Other (seldom found)
Textile nº				
UdeC-MA.07.c	Present? **YES** NO Comments: the weave is slightly distorted where the coarse seam thread passes through. Object is not creased.	Present? **YES** NO Comments: some insect damage around the edges of the band. Corrosion possibly prevented further damage.	Present? **YES** NO Comments: only around the edges.	Present? **YES** NO Comments: many metallic beads are loose or have fallen off; others are very damaged and partially broken.
UdeC-MA.07.d	Present? **YES** NO Comments: distorted where thick seam thread passes through central area. Object is not creased except one of the edges – very damaged. Similar as **07.b**.	Present? **YES** NO Comments: insects have particularly damaged one of the edges.	Present? **YES** NO Comments: Some holes around the edges of the band. A very thin section, very degraded, holds the most damaged edge together.	Present? YES **NO** Comments:
UdeC-MA.07.e	Present? **YES** NO Comments: very creased and distorted overall. Difficult to open up due to desiccation of the fibres and soiling, making it very stiff.	Present? **YES** NO Comments: mostly around edges. Affects both warp and weft provoking areas of loss within it as well.	Present? **YES** NO Comments: there is a big hole towards the inside of the fragment. All edges are very damaged. Object is fragmentary and incomplete, clearly part of something much larger.	Present? YES **NO** Comments:
UdeC-MA.07.f	Present? **YES** NO Comments: same as **07.e**.	Present? **YES** NO Comments: One edge is particularly damaged by insects.	Present? **YES** NO Comments: object is a small corner or edge of something else – incomplete. One edge is particularly damaged by insects.	Present? YES **NO** Comments:

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile (continued).

Type of damage	Creases and distortions			Insect damage			Areas of loss / Structural damage			Other (seldom found)		
Textile nº												
UdeC-MA.07.g	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: very creased and distorted overall. Desiccation of the fibres and soiling make it very stiff.			Comments: particularly around the two edges that have no decoration.			Comments: object is a small corner or edge of something else – incomplete.			Comments:		
UdeC-MA.07.h	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: very creased and distorted overall. Desiccation of the fibres and soiling make it very stiff and it's difficult to open up for observation.			Comments: generalized.			Comments: tears and holes due to insect damage. Object is incomplete, no edges visible.			Comments:		
UdeC-MA.07.i	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: same as **07.h**.			Comments: same as **07.h**.			Comments: same as **07.h**.			Comments:		
UdeC-MA.07.j	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: same as **07.h**.			Comments: same as **07.h**.			Comments: same as **07.h**.			Comments:		
UdeC-MA.07.k	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: same as **07.h**.			Comments: same as **07.h**.			Comments: same as **07.h**.			Comments:		
UdeC-MA.07.l	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: same as **07.h**.			Comments: same as **07.h**.			Comments: same as **07.h**.			Comments:		
UdeC-MA.07.m	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: same as **07.h**.			Comments: same as **07.h**.			Comments: same as **07.h**.			Comments:		

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile (continued).

Type of damage	Creases and distortions			Insect damage			Areas of loss / Structural damage			Other (seldom found)		
Textile nº												
UdeC-MA.07.n	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: very creased and distorted overall. Desiccation of the fibres and soiling make it very stiff.			Comments: half of object is particularly damaged by insects and very fragmentary.			Comments: half of object is attached to 'main body' by a very small section. Extremely friable. Loss of warp and weft throughout the edges.			Comments:		
UdeC-MA.07.o	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: as above.			Comments: generalized.			Comments: there are no visible edges or selvedge. Object is incomplete with all edges very damaged and some areas of loss towards the centre.			Comments:		
UdeC-MA.07.p	Present?	YES	**NO**	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments: around the edges of the fragments.			Comments: very fragmentary, neither edges nor selvedge present.			Comments:		
UdeC-MA.07.q	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: as above.			Comments: generalized.			Comments: only one edge visible. Object is very fragile and almost split into three sections due to insect damage.			Comments:		
UdeC-MA.07.r	Present?	YES	**NO**	Present?	YES	**NO**	Present?	**YES**	NO	Present?	YES	**NO**
	Comments:			Comments:			Comments: the rope is coming undone and it is unknown how long it was originally.			Comments:		

Table 3. Shows general damage characteristics according to creases, distortions and structural damage of each textile (continued).

Type of damage	Creases and distortions			Insect damage			Areas of loss / Structural damage			Other (seldom found)		
Textile nº												
UdeC-MA.07.s	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: very creased and distorted overall. Desiccation of the fibres and soiling make it very stiff.			Comments: around edges, not very generalized.			Comments: object is incomplete. Only one edge is visible with a seam.			Comments:		
UdeC-MA.07.t	Present?	**YES**	NO	Present?	**YES**	NO	Present?	**YES**	NO	Present?	YES	**NO**
	Comments: as above.			Comments: generalized.			Comments: object is extremely friable and damaged overall. Areas of loss around edges and within the fabric as well make the textile impossible to handle or manipulate without fibre loss.			Comments:		

Figure 3. Photographic examples of the types of damage described in Table 3.

Creases and distortions	Insect damage	Areas of loss / Structural damage	Rewoven areas
			
			
			Broken and missing metallic beads

3. Table 3 Discussion

- 24 textiles (92.6%) present creases and distortions. Some are very difficult to open up for observation due to ingrained soiling and desiccation of the fibres, becoming very brittle and stiff. There are only two very fragmentary textiles that do not present visible creasing.
- 25 textiles (96.2%) present insect damage. The only one that appears to remain unaffected is a rope (**UdeC-MA.07.r**).
- Insects appear to be inactive. The author (subjectively) noticed a relatively dry environment and cold temperature in the storeroom, but this might change in time and perhaps generate the growth of hidden eggs. It is unknown to the author if these are indeed present, as could not be observed with the available magnification tools. It is still important to control the environment and possibly propose a strategy to remove any remaining eggs and/or insects in the textiles.
- All textiles present areas of loss and structural damage, except for **UdeC-MA.05**, which is a bag that only presents small amounts of insect damage on the opening edge.
- Re-weaving is only evident in one textile (**UdeC-MA.02**), provoking further distortions of the weave due to the use of much thicker yarns and different tension than that originally intended.
- **UdeC-MA.01** is the only one that presents almost complete loss, considering more than half of it could be missing. This is thought to have occurred in the burial environment; the central area is particularly damaged, stiff and brittle, revealing an almost black colour. Perhaps decomposition fluids (?).

There is still much analysis to be done on all types of soil and damage, and for the time being their origin and the reasons behind them cannot be confirmed due to lack of adequate equipment. It is hoped funding will be given for these analysis that will aid the conservation treatment.

Appendix IV:

‘Aula 7’ Storeroom - S.W.O.T. analysis

Strengths	Weaknesses
- Good shelving system, enough space for all objects to be stored within it. - Being part of a University, the collection can be easily accessed by students and scholars, allowing people to learn from it and do research. - Located on the ground floor but on top of a small hill, far from the river and any flooding-prone areas. - Even though it's an old building, its location on the ground floor protects it from possible leaks and other sources of additional humidity and dampness. - The workroom is the same as the storeroom: objects do not need to be moved far in order to be examined. - Good housekeeping and maintenance as part of the University's cleaning scheme.	- Due to geographical location, humidity might be higher than ideal. - The room is located right next to the cafeteria. Food odors can be felt during lunch hours, proving that ventilation is not the best.
Opportunities	**Threats**
- The database's update will allow for new improvements in the digital access of the collection, and could pose an opportunity to make the objects available for study and research online. - Current installations and space allow for small improvements that could increase efficiency of use of space while allowing safe storage for the collection.	- Constant opening and closing of the door prevents proper control of temperature and humidity. Door does not shut unless locked. - Materials in use currently for storage of textiles have not been replaced for a while and are becoming acidic, which could prove detrimental for the textiles in the long-term. - Dust deposition is constant as the textiles are not covered or sealed. This also represents a problem in contaminating evidential soil. - Access to large objects or boxes is difficult due to the narrow space of the aisles when the shelving system is opened: requires two people to safely handle these. - No environmental controls whatsoever. Relative humidity, light, pests and temperature are not being monitored in any way. - No quarantine section for new objects arriving in the store.

Appendix V:

Time and costs estimates

Time estimates

ACTIVITY	ESTIMATE Lower	Upper	COMMENTS
Client liaison	20:00	24:00	
Project management	48:00	56:00	- Literature review and associated research - Planning a conservation strategy
Documentation	24:00	32:00	- Initial documentation of the textile collection - Survey of the storeroom
Estimate	2:00	3:00	Time and cost estimates.
Handling and room prep	1:00	2:00	
Before photo	9:00	12:00	For all objects.
Documentation	24:00	32:00	Discussion with peers, update and completion of initial documentation. - Will be updated as project progresses.
Selecting materials	12:00	16:00	- Packing materials and tools - Humidification materials/equipment - Cleaning equipment and tools
Installing environmental controls	8:00	12:00	- RH/temp datalogger - Lux datalogger - Appropriate software - Pest traps - Preparation of monitoring procedure and associated excel sheets
Analysis and testing	-	-	If possible: - SEM - FTIR - Stereomicroscope
Fibre & materials ID	3:00	5:00	If possible.
Pest control treatment	01:30	3:00	Possibly through anoxia, if necessary. This process takes weeks to complete, and will be done parallel to other stages of the project. What is estimated is the 'setup' of the treatment for each textile.
RH tests	9:00	12:00	For all objects.
Surface cleaning	27:00	32:00	This will vary on each object and has been calculated for the whole collection.
Humidification	40:00	50:00	This process can also be done parallel to other activities. Estimated is: **setup** and **monitoring**.
I.P. photo	-	-	Taken throughout the project.
Preparation of padded boards when needed	20:00	24:00	Estimate includes placement on padded boards. Possibly no stitching necessary, as

			the boards will be custom made according to the needs of each object.
After photo	9:00	12:00	For all objects.
Packing	40:00	48:00	Preparation of boxes, padding, etc.
Labelling	12:00	16:00	- Inventory number assignation. - Preparation, printing and placement of labels.
Final report	20:00	24:00	
Subsequent research	-	-	As part these textiles' life within the University, their study and investigation will be promoted to learn more of their provenance and cultural value.
TOTAL	329:30	415:00	
AVERAGE	372:15		This is the amount of hours considered for the associated 'working hours' costs.
Estimate date	August 13, 2013		
Estimate prep by	Francisca A. Lucero Juez		

Costs estimates

MATERIAL	COST (CLP)	UNIT	QTY	UNIT	PRICE / QTY
Papier Maché cardboard	$ 2,290.00	per sheet (177*110cm)	15	sheets	$ 34,350.00
Double-sided tape (acid-free)	$ 7,800.00	per unit (9mm*33mt)	5	units	$ 39,000.00
Blotting paper	$ 1,500.00	per sheet	10	sheets	$ 15,000.00
Sympatex®	$ 30,000.00	per sheet (1.50mt wide)	1	sheet	$ 30,000.00
Acid-free tissue paper	$ 198.00	per sheet	200	sheets	$ 39,600.00
Acid-free paper	$ 1,150.00	per sheet (118x82cm)	20	sheets	$ 23,000.00
Undyed calico fabric	$ 700.00	per metre (1.20mt wide)	4	metres	$ 2,800.00
Polyfelt®	$ 4,200.00	per metre (1mt wide)	2	metres	$ 8,400.00
Cotton Domette	$ 21,350.00	per metre (1.50mt wide)	2	metres	$ 42,700.00
Cotton thread	$ 800.00	per bobin	2	bobins	$ 1,600.00
Sample bags (small)	$ 1,600.00	per 100 units pack	2	packs	$ 3,200.00
Hygrometer / Thermometer	$ 8,000.00	per unit	3	units	$ 24,000.00
Pest traps (generic, non-toxic, no-chemicals)	$ 3,590.00	per pack of 4 traps	1	pack	$ 3.590.00
Lux meter (portable)	$ 21,500.00	per unit	1	unit	$ 21,500.00

Materials cost:	$ 288,740.00
CLP per hour:	$ 20,000.00
Working hours:	
minimum	329.5
maximum	415
average	*372.25*
Average hours cost:	$ 7,445,000.00
Grand total:	$ 7,733,740.00